PROCEEDINGS

OF THE

NINTH ANNUAL MEETING

OF THE

Florida State Horticultural Society

HELD AT

JACKSONVILLE, FLORIDA,

MAY 5th, 6th and 7th, 1896.

COMPILED BY THE SECRETARY.

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*NOTE.—The following Executive Committee was elected at the 1896 Annual Meeting, to serve for the year 1897: Lyman Phelps, E. S. Hubbard, C. F. A. Bielby. The vacancy caused by the death of Mr. Bielby (on July 9, 1896) was filled by the appointment of F. G. Sampson. Mr. Bielby was one of the leading citizens of the State, a prominent horticulturist and one of the founders of the Society; a proper tribute to his memory will appear in the next Annual.

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Donogh, Dr. J. Ormsby, 116 W. 6th St., Cincinnati, Ohio.
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Glynn, Wm. F., Care of Edward W. Glynn, Saginaw, Mich.
Goodbody, A. G., 1414 West Jefferson St., Louisville, Ky.
Goodyear, Chas., Merritt, Fla., and 115-117 Nassau St., New York City.
Gore, Mahlon, Orlando.
Gottfried, Fred, 879 Holton St., Milwaukee, Wis.
Gould, J. H., Box 747, Binghamton, N. Y.
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Grus, Wm., 113 Dearborn St., Chicago, Ill.
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Gurney, Mrs. L. H., Merritt.
Hale, (M. D.) E. M., 2200 Prairie Ave., Chicago, Ill.
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Kendig, John, 27 N. 7th St., Philadelphia, Pa.
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Lindblomb, Robert, 7 Board of Trade, Chicago, Ill.
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Linton, W. S., Linton, Fla., and Saginaw, Mich.
Livingston, Wm., Box 65, Lowell, Mass.
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Ludden, J. E., 132 Nassau St., New York City.
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Nilsson, Pehr. W., 163 E. Chicago Ave., Chicago, Ill.
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Scotton, J. A., Archer.
Scotton, J. M., Archer.
Seaton, Wm., Box 230, Quebec, Canada.
Sellmer, Capt. Chas., Zellwood.
Shepard, C. T., Box 85, Tallapoosa, Ga.
Shimer, Mrs. F. A. W., DeLand.
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Stanton, J. H., Jacksonville.
Stanton, W. P., 155 St. Clair St., Cleveland, Ohio.
Stebbins, Lucius D., Orlando.
Stetson, John B., DeLand, Fla., and 1754 N. 4th St., Philadelphia, Pa.
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Taylor, Geo. W., Box 200, Crafton, Pa.
Taylor, Wm. A., U. S. Dep't. of Agri., Washington, D. C.
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Upham, E. S., South Lake Weir.
Van Ness, Eugene, Care of Alex. Brown & Sons, Baltimore, Md.
Van Roe, J., Tampa.
Varga, Eugene, 75 Andrassy St., Budapest, Hurgary.
Wakelin, Amos, Bullitt Building, Philadelphia, Pa.
Waldron, Edgar N., Daytona.
Walker, (Sr.) Dr. Geo. E., Huntington.
Wallace, J. V., Jacksonville.
Walton, W., Harwood.
Wardwell, W. H., Brookline, Mass.
Ware, M., Lady Lake.
Warner, S. C., Palatka.
Wartman, E. L., Citra.
Watson, Thos. C., Pensacola.
Watters, (A. M., M. D.) W., 26 South Common St., Lynn, Mass.
Waugh, Thos. C., San Antonio.
Webber, H. J., Eustis.
Weeks, O. B., Jaffery.
West, G. M., Escanaba, Mich.
Westlake, J. Willis, Lake Helen.
Wharton, S., Lacoochee.
White, Chas. W., Citra.
Whyte, John, Orange Grove, Blue Cliff, District Uitenhage, South Africa.
Wiggins, Mrs. S. H., Quincy.
Wightman, L., Orange Park.
Wightman, Mrs. L., Orange Park.
Wilkinson, W. P., Hawks Park.
Williams, F. M., Pensacola.
Williams, H. S., Rockledge.
Wilson, Geo. J., Avon Park.
Wilson, Geo. W., Jacksonville.
Wilson, J. I., Haines City.
Wilson, J. P., Inverness.
Wilson, Lorenzo A., Jacksonville.
Wilson, (M. D.) Mrs. Mary E., 134 N. Duke St., Lancaster, Pa.
Wilson, P. F., Gainesville.
Winter, Edward, DeLand.
Wipf, Henry, Avon Park.
Wood, Geo. H., Tangerine.
Wood, O. K., Cocoa.
Wood, Wm. H., 8 E. 63rd St., New York City, N. Y.
Woodbury, R. A., Duke.
Woodbury, Mrs. R. A., Duke.
Woodman, W. I., St. Augustine.
Woodworth, N., Welaka.
Wright, Geo. H., Orlando.
Wright, Geo., W., Pensacola.
Wright, H. A., Glenwood,
Wright, N. M., Orlando.
Wyckoff, Jno. S., Citra.

474 Members this year

CONSTITUTION.

ARTICLE 1 This organization shall be known as THE FLORIDA STATE HORTICULTURAL SOCIETY and its object shall be the advancement of horticulture.

ART. 2. Any person may become a Member of the Society by subscribing to the Constitution, and paying one dollar. Any person may become a Life Member of the Society by subscribing to the Constitution and paying ten dollars.

ART. 3 Its Officers shall consist of a President, three Vice-Presidents, Secretary, Treasurer and Executive Committee of three, who shall be elected by ballot at each annual meeting. After the first election, their term of office shall begin on the first day of January following their election.

ART. 4. The regular annual meeting of this Society shall be held on the second Tuesday in April, except when otherwise ordered by the Executive Committee.

ART. 5. The duties of the President, Vice-Presidents, Secretary and Treasurer shall be such as usually devolve on those officers. The President, Secretary and Treasurer shall be, *ex officio* advisory members of the Executive Committee.

ART. 6. The Executive Committee shall have authority to act for the Society between annual meetings.

ART. 7. Sec. 1. The Constitution may be amended by a vote of two-thirds of the members present.

ART. 7. Sec. 2. An amendment to the Constitution and By-Laws shall be proposed at one Annual Meeting and voted on at the next Annual Meeting unless unanimous consent is given to its immediate consideration.

BY-LAWS.

1. The Society year shall be co-extensive with the calendar year, and the annual dues of Members shall be one dollar.

2. All bills authorized by the Society or its Executive Committee, for its legitimate expenses shall be paid by the Secretary's draft on the Treasurer, O. K.'d by the President.

3. The meetings of the Society shall be devoted only to Horticultural topics from scientfic and practical standpoints, and the Presiding Officer shall rule out of order all motions, resolutions and discussions tending to commit the Society to partisan politics or mercantile ventures.

PROCEEDINGS

OF THE

NINTH ANNUAL MEETING

OF THE

FLORIDA STATE HORTICULTURAL SOCIETY

The ninth annual meeting of the Florida State Horticultural Society was held at Jacksonville upon the invitation of the Board of Trade of that city. The Society convened in the rooms of the Board of Trade on Tuesday, May 5th, 1896, at 7:30 o'clock, P. M., in accordance with the programme as published, and adjourned sine die, on Thursday following, at 1 o'clock, P. M. About 200 members were in attendance, and the meeting was one of the most interesting that has been held by the Society.

MINUTES.

In the minutes, which follow, all the events and transactions of the meeting are given, in condensed form, in the order of their occurrence; the addresses, papers, discussions, reports, and other matters of general interest or special importance, are simply noted, and appear in full under appropriate heads in the body of the volume, and may be readily referred to by turning to the page given in connection with each below.

For addresses of Members (which are not given below) see "List of Members." Where the address is given the person referred to is not a member.

FIRST DAY.

EVENING—OPENING SESSION.

Tuesday, 7.30 o'clock, P. M.

1. Call to order by President Adams.

2. Prayer, Elder J. M. Thompson, of Marion County.

3. Address of Welcome, H. H. Buckman, Esqr., of Jacksonville. (See "Address of Welcome," page 7).

4. Response to the Address of Welcome, Geo. H. Wright. (See "Response to the Address of Welcome," page 9).

5. On motion of the Secretary, W. S. Hart and H. G. Hastings were author-

zed to act as Associate Secretaries during this meeting.

6. President's Annual Address. (See "President's Annual Address," page 10).

7. Secretary's Annual Report. (See "Secretary's Annual Report," page 17).

8. Treasurer's Annual Report. (See "Treasurer's Annual Report," page 20).

9. On motion, the Executive Committee was granted further time for its Annual Report.

SECOND DAY.

MORNING SESSION.

Wednesday, 9.30 o'clock, A. M.

10. Call to order by the President.

11. Standing Committee on Citrus Fruits, called. Paper read by H. B. Stevens, Chairman. See "Orange and Lemon Growing—How to Manage for Quick Returns, and Best Results in the Long Run, With Least Frost Risk," page 57).

12. Discussion under topic "Citrus Fruits," following Mr. Stevens' paper. See "Is Our Climate Changing?—Historical and Meteorological Evidence Bearing on This Point," page 26).

13. Under topic "Citrus Fruits," paper read by Edward Winter, member of the standing Committee on Citrus Fruits. See "Restoring Frozen-Back Orange Trees—Experience with 'Bark Grafting' or 'Spring-Budding' Below the Surface," page 51).

14 Under topic "Citrus Fruits," Discussion following Mr. Winter's paper. See "Insect Enemies of Tender Citrus Growth—Protecting Young Buds and Sprouts From Their Attacks," page 52).

15. Standing Committee on Diseases and Insects of Citrus, called. Topic deferred awaiting the arrival of H. J. Webber, Chairman.

16. Executive Committee's Annual Report. Discussion. Amendment to the Constitution recommended. Recommitted to the Committee for revision and subsequent report. (See "Executive Committee's Annual Report," page 20).

17. "The Microscope in Agriculture and Horticulture." Special paper prepared by C. J. K. Jones, and read by E. O. Painter (for the Secretary). (See "Microscopy in Horticulture — Scientific Training Not Essential to the Effective Use of the Microscope by the Florida Fruit Grower," page 109).

18. Vote of thanks to Mr. Jones for his paper. (See "Resolutions of Thanks," page 130).

19. "Canaigre." The programme for the Session having been completed, upon invitation, by unanimous consent, Mahlon Gore addressed the Society on this subject (See "Canaigre," page 117).

20. By unanimous consent the topic of "Citrus Fruits" was reverted to, and the protection of orange groves from cold was discussed at length. (See "Protecting Orange Groves From Cold—Practical Experience with Wood, Resin and Oil Fires, and Smudges—Introducing Steam into the Groves—How Protecting Against Frost Differs from Protecting Against Freezes," page 28).

AFTERNOON SESSION.

Wednesday, 2.30 o'clock, P. M.

21. Call to order by the President.

22. Standing Committee on Peaches and Plums, called. Paper by E. D. Putney, member of the Committee, read by the Secretary. (See "Peaches in the Lake Region—The Outlook in General—Methods

and Results—Requisites for Successful Culture," page 62).

23. Discussion, under topic "Peaches and Plums." (See "Peach Growing in South Florida—Best Varieties—Profitableness of the Industry, Etc., page 63. Also see "Plum Curculio in Peninsular Florida," page 64. Also see "Peaches and Plums on the West Florida Highlands," page 59).

24. Amendment to the Constitution, revised in accordance with the instructions of the Society, submitted by the Executive Committee and unanimously passed. (See "Executive Committee's Annual Report," page 19. Also see Constitution as Amended, page X).

25. Standing Committee on Pears and Apples called. No report.

26. Discussion under topic "Pears and Apples." (See "Oriental Pears—Advantages Which May be Obtained by Grafting—Bearing Qualities of the LeConte in West Putnam," page 66).

27. Standing Committee on Grapes called. No report.

28. Discussion under topic "Grapes," (See "Grapes—A Chapter of Experience from Different Sections of the State," page 67).

29. Standing Committee on Figs, called. No report.*

30. The programme for the session having been completed, the topic "Citrus Fruits," was reverted to, and the best method of treating the groves which were cut back by the freeze of 1895 was discussed at length. (See "Oranges and Citrus Fruits—Sprouts from the Frozen-back Trees—How Many Should be Allowed to Grow and How Should These be Treated?—The Single vs. the Divided Stem—Best Varieties to Bud—The Origination of New Varieties--Influence of Environment on the Characteristics of the Fruit," page 40).

31. On motion the President was instructed to appoint a Committee on Necrology. (See "Necrology," page 126).

EVENING SESSION.

Wednesday, 7.30 o'clock, P. M.

32. Call to order by the President.

33. Election of Officers. (See list of "Officers Elect for 1897," on an initial page.)

34. On motion, ordered that the expenses of the Secretary's office be borne by the Society.

35. On motion, the regular order was suspended, and, in response to unanimous invitation, H. G. Hubbard addressed the Society on the subject of Camphor production in Florida. Mr. Hubbard's remarks being followed by some discussion. (See "Camphor—The Result of Experiments in the Cultivation of the Camphor Tree and the Manufacture of Camphor Gum in Florida," page 34).

36. Letters expressing regret for unavoidable absence read from P. J. Berckmans, C. F. A. Bielby, G. W. Mellish, Thos. Hind.

37. On motion, matter of bank deposit for the Society's funds referred to the Executive Committee.

38. Standing Committee on Kaki, called. No report.

39. Invitation to hold next Annual

*NOTE Some topics, like Figs, Kaki and Strawberries, which received but little attention at the 1896 meeting, have been heretofore considered at length by the Society. See published reports previous meeting.

Meeting at Orlando, presented by Mahlon Gore. Action as to place of next meeting deferred until a later session. (See "Place Next Meeting," page 125).

40. Report of the Standing Committee on Strawberries and Miscellaneous Fruits, called. No report.

41. Report of Standing Committee on Vegetables, called. No report.

42. Discussion under topic "Vegetables." (See "Diseases of the Tomato," page 107).

THIRD DAY.

MORNING SESSION.

Thursday, 9.30 o'clock, A. M.

43. Call to order by the President.

44. Resolution of Thanks to Treasurer, J. B. Anderson, unanimously passed. (See "Resolutions of Thanks," page 130).

45. Standing Committee on Fertilizers, called. No report. Discussion. (See "Fertilizers and Fertilizing," page 115).

46. Special Committee on Joint Session, Texas and Florida State Horticultural Societies, called. Report, by G. L. Taber, Chairman, read by the Secretary. Report adopted and Committee Discharged. (See "Joint Meeting—Texas and Florida State Horticultural Societies," page 121).

47. Special Committee on Better Weather Warnings, called. Speaking for the Committee, A. H. Manville, member of the Committee, stated that, inasmuch as the Weather Bureau had anticipated the wishes of the Society in the matter of Better Weather Warnings, the Committee had not prepared a formal report, but, in lieu of this, had requested A. J. Mitchell, Director of the U. S. Weather Bureau for Florida, to explain to the Society the workings of the Bureau in its relations to rural industry in this State.

48. "The Weather Bureau--Its Importance and Relations to the Producers of Florida." Paper by A. J. Mitchell, prepared at the special request of the Society and read by the author. (See "The Weather Bureau—Its Importance and Relations to the Producers of Florida," page 22).

49. Discussion following Director Mitchell's paper. (See "Is Our Climate Changing?— Historical and Meteorological Evidence Bearing on This Point," page 26. Also see "Protecting Orange Groves from Cold—Practical Experience With Wood, Resin and Oil Fires, and Smudges—Introducing Steam Into the Groves—How Protecting Against Frost Differs From Protecting Against Freezes," page 28).

50. Vote of Thanks to Director Mitchell for his paper. (See Resolutions of Thanks," page 130).

51. Vote of Thanks to the F. C. & P. R. R. for their Whistle Signals. (See "Resolutions of Thanks," page 130).

52. Committee on Necrology announced by the President, as follows: W. S. Hart, James A. Harris, A. W. Stewart. (See "Necrology," page 126).

53. Committe on Final Resolutions announced by the President, as follows: H. G. Hastings, Geo. H. Wood, J. B. King. (See "Resolutions of Thanks," page 130).

54. Place of next meeting taken up. Invitation submitted by Jacksonville Board of Trade. (An invitation having been presented from Orlando at a previous session). Discussion. Orlando selected by vote of 49 to 34. (See "Place of of Next Meeting," page 125).

55. Standing Committee on Tropical Fruits, called. Paper prepared by W. A. Marsh, Chairman, read by the Secretary. (See "Tropical Fruits—A Brief Account of the More Important Fruits of Extra-tropical Florida—With Some Notes on Culture and Present Condition," page 88).

56. "Notes on Pineapples and Their Diseases." Special paper by H. J. Webber. (See "Notes on Pineapples and Their Diseases," page 92).

57. Excursion to Panama Park, (tendered the Society by J. R. Tysen, Little Brothers and Wilson & Toomer, under the auspices of the Board of Trade) announced for 3 o'clock P. M.

58. On motion, adjourned to 1.30 o'clock P. M. for an "ad interim" session before the leaving time announced for the excursion.

AFTERNOON ("AD INTERIM") SESSION.

Thursday, 1.30 o'clock, P. M.

59. Call to order by the President.

60. Standing Committee on Entomology, called. Papers prepared and read by P. H. Rolfs, Chairman. (See "Injurious Insects of the Year," page 96. Also see "A brief Study in Insect Dissemination," page 99. Also see "Advancements made in Insecticides," page 101. Also see "A Visit to the Gypsy Moth Commission," page 102).

61. Discussion under topic "Entomology." (See "Legislation Against Fruit Pests," page 105).

62. On motion, following Committee elected on Legislation Against Diseases and Insects: Dudley W. Adams, P. H. Rolfs, L. Montgomery, H. J. Webber.

63. On motion, topic of "Peaches and Plums" was reverted to and paper prepared by G. W. Mellish was read by the Secretary. (See "Peaches and Plums on the West Florida Highlands," page 59).

64. Standing Committee on Irrigation, called. No report. Discussion. (See "Irrigation—A Creap Way of Watering and an Effective Method of Destroying the White Fly," page 50).

65. Adjourned for Excursion to Panama Park.

EVENING SESSION.

Thursday, 7.30 o'clock, P. M.

66. Call to order by the President.

67. Standing Committee on Ornamentals, called. Remarks by H. G. Hubbard. (See "Ornamentals from the Tropics—Strictly Tropical Shrubs and Plants that Adapt Themselves to Our Climate," page 86).

68. Under topic "Ornamentals." Paper prepared and read by Mrs. P. H. Rolfs, Chairman of Standing Committee on Ornamentals. Discussion. (See "Some Easily Grown Ornamental Plants," page 83).

69. Standing Committee on Native Fruits, called. No report.

70. Standing Committee on Introduction of New Fruits, called. No report.

71. Standing Committee on Marketing, called. Paper prepared by J. B. King, member of the Committee, read by the Secretary. (See "Marketing Oranges—Practical Suggestions on Handling and Shipping," 120).

72. Standing Committee on Transportation, called. No report.

73. Topic of "Diseases and Insects of Citrus," (which was passed in its proper place in the programme as noted above), taken up. Paper prepared and read by H. J. Webber, Chairman of the Standing Committee on Diseases and Insects of Cit-

rus. (See "Diseases and Insects of Citrus—Blight, Dieback, Sooty Mold, Scab—New Facts Regarding These Maladies and Their Treatment Derived from the Investigations of the Past Year," page 77.)

74. Discussion under topic "Diseases and Insects of Citrus. (See "Diseases and Insects of Citrus," page 70). Also see "The White Fly—The Woods and Swamps Full of Insects Which Cannot be Distinguished from the White Fly—Hence the Futility of Attempting its Extermination or Restriction by Drastic Laws," page 77).

75. Discussion under topic "Diseases and Insects of Citrus," continued. (See "Exterminating Moles," page 79).

76. On motion A. W. Stewart added to Special Committee on Legislation against Diseases and Insects.

77. Discussion under topic "Diseases and Insects of Citrus," continued. (See "Orange Borers," page 77).

78. Report of Standing Committee on Catalogue, called. Report, as published in the 1895 Annual, submitted by A. H. Manville, Chairman. On motion referred to the Executive Committee for revision and adoption. (See Catalogue of Fruits, page I to XXII).

79. Vote of Thanks to Messrs. Hart and Hastings for their service as Associate Secretaries at this meeting. (See "Resolution of Thanks," page 130).

80. Standing Committee on Nomenclature, called. E. S. Hubbard, Chairman, said: "The Committee on Catalogue has practically taken the place of the Committee on Nomenclature. In the work of preparing the Catalogue of Fruits I gave Mr. Manville, Chairman Catalogue Committee, such assistance as I could render. In view of the fact that these Committees cover the same ground, I would suggest that the Nomenclature Committee be discontinued and combined with the Catalogue Committee."

81. Report of the Committee on Final Resolutions unanimously adopted. (See "Resolution of Thanks," page 130).

82. Adjourned sine die.

MEMBERS PRESENT.

As stated above, it is estimated that about 200 members were in attendance. Of these the following registered with the Secretary:

Dudley W. Adams,
B. H. Alden,
Geo. W. Adams,
H. E. Anderson,
C. A. Bacon,
Andrew Barthle,
John J. Beers,
Peter Bernd,
A. G. Branham,
Benj. N. Bradt,
Sol Bachman,
Austin C. Bennett,
E. Bean,
J. W. Boring,
W. H. Bigelow,
W. A. Bours,
W. E. Baker,
Wm. A. Bradford,
A. Benedict,
L. Cameron,
E. W. Chamberlain,
N. L. Clarke,
J. Crosby,
John Cannon,
J. M. Chaffers,
John Clark,
J. T. Chapman,
Miss M. H. Clarke,
W. A. Cooper,
Geo. Cooper,
Mrs. Geo. Cooper,
Wm. Dafoe,
H. F. Douglass,
Ed. Delouest,
D. O. Davies,
C. L. Delano,
J. W. Fisher, M. D.,
Mahlon Gore,
W. D. Griffing,
C. M. Griffing,
L. H. Gurney,
Rt. Rev. Wm. Crane Gray,
Mrs. L. H. Gurney,
Mrs. Kate L. Hubbard,
H. G. Hubbard,
E. S. Hubbard,
E. K. Harris,
Henry J. Hampton,
J. A. Harris,
T. F. Harrison,
W. S. Hart,
Dr. H. A. Hastings,
H. G. Hastings,
Mrs. H. G. Hastings,

Thos. Hastings,
H. A. Hempel,
B. L. Hickman,
D. N. Hine,
W. F. Hobson,
Prescott Jernegan,
J. B. King,
Geo. W. Leorard,
W. J. Lewis,
Henry Luthge,
Frank H. Lytle,
H. von Luttichau,
Mrs. Dorothea Luthge,
Dr. S. G. Miller,
C. A. Miller,
S. B. Merryman,
F. S. A. Maude,
H. W. O. Margary,
Joseph Morford,
A. H. Manville,
M. M. Miner,
A. J. Mitchell,
J. P. Mace,
Dr. L. Montgomery,
Mrs. L. Montgomery,
E. M. Montague,
Mrs. E. M. Montague,
M. S. Moremen,
Benj. F. McGraw,
H. V. Noszky,
Mrs. H. V. Noszky,
Geo. V. Ott,
C. F. Pierson,
Stephen Powers,
Dr. E. E. Pratt,
A. B. Prevatt,
Rev. Lyman Phelps,
D. W. Perry,
E. O. Painter,
C. Irving Page,
P. H. Rolfs,
Mrs. P. H. Rolfs,
Maj. O. P. Rooks,
M. E. Realing,
Harrison Reed,
Mrs. M. T. Reeves,
M. T. Reeves,
Thos. E. Richards,
Dr. J. O. Scofield,
S. M. Scott,
J. M. Scotton,
H. H. Slayton,
M. Edwin Schlater,
N. D. A. Sawyer,
H. A. Smith,
Rev. W. F. Stewart,
H. T. Strout,
C. R. Switzer,
Harry Smith,
J. H. Stanton,
H. B. Stevens,
A. W. Stewart,
Jno. W. Stewart,
O. R. Thacher,
Geo. W. Taylor,
Geo. L. Taber,
P. Tischler,
W. C. Townsend,
J. T. Turner,
C. R. Tysen,
J. R. Tysen,
W. Walton,
H. J. Webber,
O. B. Weeks,
J. Willis Westlake,
Mrs. L. Wightman,
Geo. W. Wilson,
J. I. Wilson,
P. F. Wilson,
Edward Winter,
Geo. H. Wood,
O. K. Wood,
R. A. Woodbury,
L. A. Wilson,
Mrs. R. A. Woodbury,
Geo. H. Wright,
N. M. Wright,
Jno. S. Wyckoff.

ADDRESS OF WELCOME.

BY H. H. BUCKMAN, ESQR., JACKSONVILLE, FLA.

[SEE MINUTES PAGES 1 to 6, ITEM 3.]

Ladies, Mr. President and Members of the Horticultural Society of the State of Florida: On behalf of the Board of Trade and of the fair City of Jacksonville, we tender you a heartfelt welcome. It was an ancient and beautiful custom in times many years past, when for the protection of the cities of the country, and when every city was a kingdom in itself, that great walls of stone were built about it, with great gates, which locked at night, that when a welcome guest appeared before them were thrown wide open, and the keys tendered and the freedom of the city and of its inhabitants were offered, a beautiful symbol showing the fullest hospitality, which seems to have found its origin in days so remote that we can hardly trace the beginning of its rise.

In our age, where we do not need walls to guard our interests where our growing population is such, that we want all the

room in which we can spread beyond the confines of our borders, where we do not need gates to shut out friend or foe, we can not open them, except in a symbolical manner. We have no keys to tender you, but we open our hearts and arms, and we extend you the right hand of fellowship, and we give you the freedom and rights, even greater than those tendered of old, to our City and our homes. This gentlemen is what we offer you.

Now in passing I can not refrain, if you will permit me, to say one word in relation to this organization. I see before me representatives of all parts of the State, whose occupation is one of the oldest which history records, that of agriculture. When man, aboriginal man, first was placed upon the earth, he looked to the soil for his necessities; he learned soon by experience that he might draw from it not only his necessities, but his comforts and his luxuries, but many ages, how many aeons of time have passed between those three conditions of necessity, comfort and of luxury. Did you ever think, and there must be many of you that have, that we can not go back and trace, with few exceptions, to its original parent source the seed we plant today; did you ever think for a moment of the fact, that they came from some wild state, and through how many ages by careful toiling, by cultivation, by fertilizing and experimenting and final success it has been brought to the condition it is now in in this particular branch. It shows not only the great age of mankind upon the earth, but it shows that patient care, that patient toil, that experimentation, that final success, which must crown every effort made towards an end. The objects of your organization, therefore, are most ancient, being from the very beginning and arising out of the necessities of mankind, this is proved from the facts, and further, for several of thousand of years past there has been little improvement by the addition of any new plants to the list we now possess, whose origin is beyond any authentic record.

If we look at our own State we can find but a few years past when such a thing as the orange was not known, except in its wild state, without cultivation, a few trees in a garden, something for show and nothing for profit. What a field has been opened.

Take a State like this with 58,000 square miles of area, with a population of little over 400,000 people, sweep away as the last freeze did nearly fifty millions of property, if not more, how much more in its relative approximation we can not say, and when I look upon the faces of your representative men before me, I am not only astonished, but have reason to be proud of my State and people in that such disasters have not proved sufficient to overwhelm you, but you stand before the world as a people, who know how to build up when the Reaper has cast down. (Applause).

Your organization here, and that of your successors must naturally tend not only for your present interests and for the interests of the population you represent, but for the permanent good of the State and of the people who must come after us. History repeats itself; each and every age, which has passed from the face of earth must leave some record to each succeeding race raking in the ashes of the past, showing the mark to which the tide has risen; whether you see it in the seeds found in the mummy of the Egyptian bur-

ied three or four thousand years ago, whether you find it carved upon the rocks or dig it from beneath the sea, it stands a silent witness of man's trials, his progress and success, which makes us in this age stand appalled—we who think we are the most enlightened people of the world—when such records point to those who have reached heights of which we are yet but on the first round of the ladder. Nothing is lost for aye. Dust returns to dust. Cities, nations, dynasties, peoples crumble to ruin and pass away, but somewhere amidst this wreck of matter is preserved the germ of life, of light, of civilization, which wants but little fostering care to sprout again, and which sooner or later a succeeding age unearths to be again the light and wonder of the world, a boon to man. Thus waving fields and fertile places become waste, and fair lands bloom and blossom neath the sun which erst were desert; each does its little mite; not only the present, but the coming race must owe to your efforts some of the many blessings the good Creator has bestowed upon mankind. God speed and crown your efforts in the present generation with the success they so richly deserve. We, all laboring in the same vineyard, but at different work, are all servants of the same Master, working for a common end, the good of the earth, and as brother workers bound by a common tie, we greet you.

Again in the name of the City of Jacksonville, in the name of the Board of Trade, we extend to you a welcome. You have business here and it is not my purpose to detain you. We ask you to accept while you are in the borders of our fair City a hospitality, which is not conveyed by words alone, but by looks, by the extended hand, which binds us together in that fraternal brother-hood, which at last seems to be encircling the universal world. We bid you welcome, and we feel proud that you have accepted our City for your annual meeting, and trust if you find that welcome here, which we earnestly hope you may, that this may not be the last time we may see you among us.

RESPONSE TO THE ADDRESS OF WELCOME.

BY GEO. H. WRIGHT, OF ORLANDO, FLA.

[SEE MINUTES PAGES 1 TO 6, ITEM 4.]

Mr. President, Ladies and Gentlemen: It is very gratifying to us as an Association to accept the cordial welcome that we have received at the hands of the citizens, and of the Board of Trade of Jacksonville. We have tested your hospitality in the past, we know that we meet you here with open arms and cordial hearts. We have met here this evening for the third time as a progressive, working horticultural and agricultural society to compare notes, to see what we have done in the past, and to see what we may do in the future. I wish that this Association had selected some one, who could with more eloquent words express our thanks to the Board of Trade and citizens of Jacksonville for this kind greeting, but as a horticulturist, as a

worker in the field I never hesitate to do my work as I find it, hence I have arisen to accept this welcome to this Association. Two years ago we met here in this room under the most favorable circumstances, our orange groves were in full blossom and bearing full crops, not only our orange groves but our crops, our vegetables, our various fruits, which no other State in this Union can surpass in quantity or quality. Today we come together as men, who have been tried and not found wanting. With over fifty million dollars of direct loss in one night, yet never a one has asked for aid, something that never has been known in the history of America. A few years ago I was residing in the great Northwest when the grasshopper ravage visited them, and one hundred thousand dollars were sent to their aid and accepted. But not one dollar of charity have we as citizens of Florida asked, and would not have accepted had it been tendered. (Applause).

We come together as progressive men, not only to compare notes of what we have done, but to learn to do our work better. If the freeze has taken our orange groves, yet we have our climate and soil, we have our energy and with proper application we will make our beloved State bloom and blossom as the rose. (Cheers). What remains for us to do in the future is not to depend wholly upon our orange crops but look to other crops which we can grow here in numbers, quantity and quality, and we can make our soil here return the owner not $25 an acre, which is a big income for the Northwest, but make it return $100 in crops.

On behalf of the Society I accept this welcome, which has been so cordially and graciously bestowed upon us, and we fall into those open arms and receive those open hearts, and while they haven't the keys of the old ancient cities to tender us, yet when we have departed from your midst we will all feel it was good to have the Horticultural Society here. I thank you most cordially for the welcome.

PRESIDENT'S ANNUAL ADDRESS.

DUDLEY W. ADAMS.

[SEE MINUTES PAGE 1 TO 6, ITEM 6.]

Ladies and Gentlemen of the Florida State Horticultural Society: There is an ancient tradition, which is very largely confided in, that the first parents of the human race were horticulturists. They lived in a garden. From the best information now available it appears that they did not own the place, but were put there to take care of it for the maker and owner. The details of the agreement are somewhat meagre, but as near as can be ascertained at this late day they were to have their board and clothes, provided they could make them out of the place, and leave the crop of fruit of one particular tree ungathered for rent. Without more

definite information as to the size of the garden, the kind and quality of the fruits and "garden sass" and the distance from a cash market, we are unable to determine whether our horticultural progenitors made a good bargain or not.

At this date, however, there seems to be a pretty general opinion that they had a "soft snap," and a good many people would jump at the job without the least hesitation. But it seems that the worthy pair were not fully satisfied with that part of the arrangement which required them to leave the fruit of one tree for the proprietors, but they wanted everything in sight. That trait of our ancestors has been transmitted unimpaired to the present time, and has reached its highest and most perfect development in the managers of our transportation companies, with the commission merchants a good second.

Well, Adam and Eve ate figs and figs. As compared with the list of fruits of the Florida State Horticultural Society theirs seems to have been very incomplete indeed. So, of course, they wanted the forbidden fruit. The record does not show whether it was a green Persimmon or a Grape fruit. But they wanted it, and

"For if she will, she will you may depend on't.
"And if she won't she won't and there's an end on't."

So of course, Eve got it.

A good many people believe that Satan put the notion into her head, but if old Mother Eve had to have help from his Majesty to get what she wanted, the women of this day are capable of giving her points. Now comes a gleam of light as to what this forbidden fruit really was. It was evidently large and tempting to look upon as it hung amid the glossy green leaves. I am inclined to the belief that it was a grape fruit, and this belief is strengthened by the fact, that after Eve had bit into it, she gave it to Adam to eat, and his opinion of that fruit is firmly entertained by the Adams of today.

When the owner of the garden came around and found his tenants at will had robbed his reserved tree he cancelled the lease, terminated their horticultural career, turned them out of the garden and condemned them to get their living by diversified farming. To those not gifted with the power to fathom mysteries this punishment seems out of proportion to the crime, and our sympathies are touched as we imagine Adam walking out of Paradise bare-headed and Eve carrying her entire trousseau and a copy of the Delineator.

Then they raised cane; Cain killed Abel, and killing each other was the principal business of the human race for 5,800 years. They can not be seriously blamed for this, for during all that time cattle and hogs were allowed to run at large. It is difficult to imagine any state of affairs better calculated to cultivate man's belligerency and put him in a state of mind to enlist under the black flag of piracy. When men and women behold a drove of razor-backs in the sweet potato patch, a herd of cattle in their corn field, and a flock of goats clearing off the clothes line, they can not be expected to give birth to anything but a progeny of pirates. And so piracy flourished.

In later years, however, there has been a gradual change taking place in public sentiment. As man became more intelligent piracy became less popular, until in highly civilized countries it is not permissible to even send out armies of hogs to prey upon the property of other people. So it comes to pass that a great many peo-

ple have gardens and are trying to get into a Paradise of their own by planting figs, grape fruit and persimmons. But their road is steep and beset with thorns and pit-falls. Diseases and frosts and drouth and insects make the way difficult.

Of all the insect plagues that infest the land and make endless and costly trouble by far the worst is the horticultural humbug. This bug appears in all sorts of disguises and in unexpected places. It will appear as a land agent and sell you a piece of No. 1 orange land below the frost line. As correspondent of a farm paper he will tell you how to grow 1,000 bushels of cassava on an acre of "poor pine land without fertilizer." As a scientist he will talk scientifically an unintelligibly about the "conjunction of the planets" that will bring storms and deadly cold. The humbug will tell you how to plant an orange grove of five acres with five hundred budded trees; in three years they will bear one half a box to the tree of such fine quality, that the 250 boxes will net $500, which will pay for all expenses and a handsome profit. He will explain how this crop will double each year and make the owner a Croesus. And thus the tenderfoot falls.

A peach grower shipped one bushel of peaches and they sold for $14.00, therefore why not grow 5,000 boxes and sell them for $70,000. Some gudgeon swallows this. The pineapple is merely an air plant and will get fat and sweet on that diet if only anchored in white sand. A man shipped eleven boxes of Tardiff oranges and they sold for $10.00 per box, then why not plant 5,000 trees to bear ten boxes each and sell them for $500,000? Thus does the humbug prey upon the credulity of the horticulturist and lead him astray.

But of all the horticultural humbugs yet discovered the greatest and most universal is enveloped in the guise of experimental horticulture. The very acme of absurdity and humbuggery is reached by experiment. Men want to learn something, and they try an experiment to find out, or they have already found out something and try an experiment to enlighten others, or they have a pet hobby, and try an experiment with a full determination to prove their hobby is safe to ride, and they do it. With only one idea in mind, with eyes fixed on one point, and mind and thought oblivious to all other influences, they try an experiment and prove just what they want to.

I know a man, who wanted to know whether soft phosphate was available for orange trees. He bought and applied one hundred tons. He could see no effect from the application, and so concluded and widely proclaimed that soft phosphate was useless for he had tried it on a large scale and it had proved worthless. He is a man of high character and his decision had much influence. But did he prove that the soft phosphate was unavailable, or did he prove that his land did not need phosphate at all? Suppose he had wanted to know if his land needed phosphate, and had put on 100 tons of soft phosphate to find out that fact. He sees no good effect from the application, so he concludes his land does not need phosphate at all. Now did he prove that, or did he prove that the soft phosphate was worthless?

Some years ago one of the liveliest humbugs that was flying was the idea that an application of lime to the soil would make oranges bright. One orange grower was bit by this bug so he would try the experiment. He earned some money by teaming, and spent it for lime and applied it to his grove where all his oranges had been

rusty—Presto! all his oranges the next year were bright, and the lime did it. He knew lime would make oranges bright, for he had tried the experiment and proved. But, said he softly in my ear, my neighbor had just as rusty oranges as I did last year, and this year they are just as bright as mine and he used no lime.

The Sulphur humbug is another variety of this bug of more recent introduction that has made an expensive incursion into many sections. Sulphur would surely make oranges bright. One of my neighbors knew it would, because he had used it heavily, and his fruit was all bright, and he preached the virtues of sulphur. Another neighbor used sulphur and his crop was the blackest, meanest, hardest, smallest, toughest, dryest, most insipid things I ever saw, and all fell to the ground before ready to pick; not a box of merchantable oranges could be found in that whole grove. Another neighbor applied no sulphur and the crop was fine, smooth and not a box of russets in a thousand.

This mania for experimenting is not new. We read in ancient lore of the student, who had heard that a crow would live a hundred years, so he caught a young one just to try the experiment.

The most glaring defect in experimentation has been and is a loose, scattering, unsystematic way of conducting the experiments. Having but one object in view, no notice is taken of other influences, which are potent to affect the result. The conclusion reached has been by such loose reasoning and on such incomplete data that to an analytical mind it is of no value. For instance an orchard was planted in rich ground, cultivated with care and liberally manured. It grew apace. Year after year it put on its robe of beautiful green, but no fruit. Disgusted and discouraged the owner seeded it down to grass and made a pasture of it, when, Presto! a magnificent crop of fruit bent the branches to the ground. Here was proof positive that an orchard should be seeded down to grass and pastured. Another man planted a poor lot of meadow to orchard. For years the trees had a rough and tumble fight for existence; they grew slowly; moss came on the bark; the leaves were small and yellow year after year, and still no fruit. At last fully convinced that orcharding was a failure, but determined to use the land for other purposes, the owner broke up the sod, manured heavily with stable manure and potash, when like magic the moss disappeared from the bark, the leaves grew large and green, and he was rewarded with loads of luscious fruit. What is the verdict of the owner? That an orchard can not be grown in sod, but must have constant cultivation. He has tried the experiment and he knows from experience.

A neighbor of his, who is in the habit of writing for the papers noticed this venture in experimental horticulture, and at once wrote to "The Slab City Farmer," that, "a neighbor of mine had an orchard that was unthrifty and unproductive. A short time ago he applied liberally of stable manure and now he has one of the most vigorous and productive orchards in the neighborhood, thus showing that J. J. Thomas was right, when he said: 'Nothing for general use is equal to stable manure.'"

About this time one of those kali men, who think potash is the panacea for all horticultural ills saw this place and published the fact, that a liberal use of potash had restored a dying orchard to health and strength, and warned all people of the great danger of using any sort of animal

manure as tending to make a soft, diseased and unproductive growth. Moral. Use mineral manure and have healthy trees and solid fruit.

An amateur strawberry grower of an experimental turn of mind was told that corn meal was a most desirable fertilizer for strawberries, so he decided to try the experiment to definitely determine the value of corn meal as a specific manure for the strawberry. For this purpose he selected a piece of deep, sandy loam, which had been in cabbage the year before, for which crop it had been fitted by turning under a heavy crop of clover, which had been treated to a heavy coat of plaster. In addition to this it had been heavily dressed with well rotted barnyard manure and one ton per acre of Prof. Rawbone's Ammoniated Phosphate. These fertilizers, of course, were completely exhausted by the cabbage, which is a gross feeder. He carefully planted this piece of exhausted land using no fertilizer whatever. He raked it fine and planted it to Triomphe de Gand. After the planting he took a quantity of corn meal, and after carefully sifting it to remove all extraneous substances, he put a teaspoonful around each hill, and raked it in with a fine tooth comb. You will notice what great care was taken to make this experiment decisive. The plat was kept scrupulously tilled and all runners clipped as fast as they appeared. The corn meal caused a most luxuriant growth. On the approach of bloom the ground was covered with finely cut wild hay between the rows. In due time blossoms appeared and fruit followed, and such fruit the oldest inhabitant had never seen. The quantity was immense, the size enormous, and the quality and beauty simply superb. Some sold at $1.00 per quart, and the average price for the whole crop was 64 cents per quart. That acre of strawberries brought $3,438.32 net, and all from the use of a teaspoonful of corn meal to each plant. I take these figures from a report made by the grower to the Fragaria Society. He closes this report with the recommendation of corn meal as the most wonderful and profitable fertilizer for strawberries, and to remove all doubt of the efficiency of this agent, he states that his neighbor Flint immediately adjoining had a strawberry field, which received no corn meal and consequently did not produce a half crop.

While harvesting this wonderful crop our friend Gates received numerous calls, among whom was old farmer Snodgrass, who has a poor opinion of such small things as strawberries and strawberry growers. Still this splendid show arrested even his attention, and he came into the lot determined to get at the bottom secret of such success. He pumped Gates till he got at the fact of the plowing under the plaster treated clover crop. A sudden smile lighted up his heavy features, a peculiar light shone in his eye, and with a half uttered "corn meal, ugh," he disappeared. The next week the following appeared in the "Weekly Plowjogger":

"Dear Plowjogger: I have just seen a most wonderful instance of the value of clover as a renovator of exhausted soils. Friend Gates turned under a heavy crop of clover grown by using plaster. Last year he grew an enormous crop of cabbage, and this year he planted it to strawberries. The result is the finest crop I ever saw and the acre will bring him at least $3,000. To show that all this grand crop is to be attributed to the clover I will state that just over the fence in precisely similar land, Mr. Flint planted strawberries with-

out clovering, and the whole crop will not pay ground rent. Could anything be more conclusive?

Respectfully yours,
J. Snodgrass."

A young man neatly dressed, and carrying a grip, also saw the show and accosted Mr. Gates with all the blandness and grace of a fertilizer agent. He congratulated him on his fine crop, and when the fact came out, that the preceding crop had received a ton of Prof. Rawbone's Superphosphate his youthful face actually glowed with satisfaction , and he said "good day" in exuberant spirits. He immediately repaired to his hotel, and wrote:

"Dear Prof. Rawbones: I have just seen the most magnificent crop of strawberries ever grown. It will net the owner over $3,000.00 per acre, and I am proud to say his success may be attributed to the use of your ammoniated superphosphate on the preceding crop. This result is all the more noticeable, because just over the fence a neighbor has a strawberry plantation, but as he had used no superphosphate his crop is every way inferior.

Yours, &c.,
Ben. Spooney, Agent.

P. S. I will write out these facts, get Mr. Gates to sign them, and it will make a splendid certificate for your next circular."

The next visitor was farmer Broadacres, who had got rich by farming, and who is looked up to as a sort of an oracle by the community in which he lives. His practical mind at once concluded that such a crop could not be the result of any superficial treatment, and he questioned friend Gates till he unearthed the fact that this piece of land was underdrained by three inch horseshoe tiles, 33½ feet apart, and 2 feet, 11 inches deep. Then saying his "Good day," he mounted his buggy and rode away. This is what followed:

"To Hon. J. Sterling Morton, Secretary of Agriculture, Washington, D. C.

Dear Sir: I have today seen an example of the good effects of underdraining, which is so convincing that it should have national notoriety through your department. Mr. Gates near here has an acre of strawberries, which I believe excels anything ever grown. The acre will bring him near $4,000.00. I think I hazard nothing in attributing his success to his thorough system of underdraining, for his neighbor with only a fence between, has no underdrains, and his strawberry crop will not pay expenses. What a tremendous return for a small sum invested in three inch horseshoe tiles.

With high regards, I am your most ob't servant, Stephen V. Broadacres."

Then came Mr. Gosport, who is Chairman of the Committee of the State Horticultural Society to prepare a list of fruits for general cultivation in the 17th district. He was struck with wonder at the sight. He examined the plantation, tasted the fruit and innocently asked Mr. Gates the name of the variety. He was told it was the Triomph de Gand. What variety is that on your neighbor's plat? Wilson Albany. As a result of this visit the Committee reported to the State Horticultural Society, that in the 17th district, the Triomph de Gand is remarkable for size, quality, beauty and productiveness, and will yield over $3,000 per acre, while Wilson Albany will not pay for cultivation. It is no use to expect success in strawberry culture unless a selection of varieties is made which is adapted to your locality.

(Signed) W. Gosport,
Com. for 17th Dist."

Scarcely had our committee man gone when an old friend of Mr. Gates came around to congratulate him on his good fortune, and claim the credit for himself for it was by his advice that he had clipped the runners instead of letting them run into a matted bed. After a friendly talk and eating abundantly of the fruit, our friend went home and wrote:

"Dear Farmer and Fruit Grower: I take pleasure in giving your readers an account of a most remarkable crop of strawberries just harvested by my neighbor. It will yield on an acre between $3,000 and $4,000. You know I have always advocated the cultivation of strawberries in hills, and here is the most convincing proof of its superiority, for just over the fence a neighbor has a plantation, which has been allowed to run together, and on the whole acre there cannot be gathered a dozen baskets of No. 1 berries. Need aught more be said.

Faithfully yours,
Abel Pritchard."

Friend Gates did not suffer from solitude while harvesting his berries, for the fame of his crop was wide. The next caller was old Inkpen, editor-in-chief of the Weed-killers Advocate. The old gentleman looked over his glasses with unfeigned delight at this unprecedented plantation, which next to its crop of fruit is remarkable for the conspicuous absence of weeds. It is impossible to tell which most delighted the new visitor, the fruit or the total absence of weeds. He shook Mr. Gates' hand enthusiastically and gave vent to unlimited praise for the faithfulness with which he had followed the teachings of the Weed-killers Advocate. The next week's issue contained the following:

"Thorough Versus Slip-shod Culture."

"Friend Gates of Cloverdale has the most magnificent crop of strawberries it has ever been our good fortune to behold. He is a long time subscriber to the Weed-killer's Advocate, and we attribute his grand success to the faithful manner in which he has followed its teachings. We never saw a field so clear of weeds; indeed, we doubt, if a thimbleful could be gathered on the entire acre, and he informs us that none have ever been allowed to grow. This acre will net him $3,000.00 after all expenses are paid, and all from $2.00 per year invested in the Weed-killer's Advocate. Per contra his neighbor just over the fence does not take our paper, and his plantation is over-run with weeds and grass, and his strawberry crop is a failure. Moral. Take the papers."

And then Prof. Ryncospermum, Professor of Botany in the State University, could scarcely give expression to his delight at the crop of fruit, and the healthy luxuriance of the foliage on this plantation. He said it confirms the wisdom of following the teachings of nature in our horticultural operations. He explained that the strawberry in a state of nature loves a cool, moist soil, and this liberal mulch of wild hay is just what is needed to secure the necessary moisture and coolness to the roots. Just behold! your plants are nicely mulched and you have health, vigor and productiveness, while your neighbor over the fence has not mulched and his plants are weak and the fruit is scarce and inferior. I shall write immediately to the Botanical Herald a scientific article giving these facts and showing the necessity of the application of scientific principles to practical horticulture.

And thus it was day after day, visitors came and saw in this corn meal experiment, not corn meal, but a proof of the

value of some pet hobby of their own. Of such as this is much of the experimental horticulture of the past and present. The experiments are conducted in such a loose and inexact manner as to fail. The conductors are too often oblivious to all conditions other than the one point under investigation, while they and not the one in view control the result. I do not wish to be understood as under-valuing experimental work, and what I have said is not intended to discourage its continued practice, but I have said this to point out how easy it is for an experiment to mislead the conductor, as well as the public, and thus cause disappointment and loss.

Another bug of huge proportions is the pruning humbug. This bug is of remarkable voracity and more disastrous to the foliage of trees than the Canker worm, because more generally disseminated. The idea seems to have taken firm lodgement in the brain of man, that every tendency of a fruit or ornamental tree is towards total depravity, and nothing but unceasing butchery will make it do right. The amount of mischief done by this bug can hardly be estimated, and if honestly and fully determined would not be believed. But I am happy to be able to say, that its ravages are less universal than formerly. As people become more intelligent and better understand the laws of plant growth this bug is less dangerous. I see many plantations of the present day in which the insect seems to have become extinct and the result is very refreshing. There are other humbugs which will appear to plague you. There are other bugs to cause you annoyance and loss, but of all the bugs that have infected fruits and fruit trees from the time of Adam to Adams the humbug is the most noisy, pestiferous, irrepressible and misleading.

SECRETARY'S ANNUAL REPORT.

[SEE MINUTES PAGES 1 TO 6, ITEM 7.]

Mr. President, and Members of the Florida State Horticultural Society.

The great work of the interim between the annual meetings is the preparation and issuance of the Society's Annual. The Society already knows with what measure of success this has been done, as the 1895 Annual went to the membership before the expiration of last year, and speaks for itself.

In 1893, and again in 1894, the Society's Annuals were issued by the State. Last year State aid was not available, and the Society got out and paid for its own report. In view of the result I think I am justified in expressing the hope that the Society will not again delegate the publication of its Annual, but will continue to issue its own Report. We have made a good beginning—let us improve it from year to year.

WORK OF THE YEAR.

Along the line of publicity and promotion, considerable work has been done.

Exhibit 1, which accompanies this report, contains a copy of each item of printed matter, issued in this connection, prior to the announcement of the Ninth Annual Meeting, and embraces:

No. 1. Six page folder of which 8,000

copies were issued, giving some account of the Society; its origin, attainments; the prospectus of its 1895 Annual, and setting forth the desirability of membership in the Society for all interested in the Horticulture of the State.

No. 2. A letter to delinquents, dated August 25th, 1895, urging the importance of renewing membership in time for publication in the Membership Roll, as contained in the forthcoming Annual.

No. 3. Four letter forms, issued December 20th, 1895, announcing the delivery of the 1895 Annual; the Committee appointments for 1896, and the fact that the fee for 1896 would become due January 1st.

No. 4 A letter form for use in 1896, prior to the announcement of the Annual Meeting, calling attention to the importance of renewing membership for the current year.

No. 5. A form of letter, dated January 14th, 1896, to the Editor of the State papers, calling attention to the 1895 Annual, and to the fact that a Complimentary copy of this Annual accompanied the letter.

No. 6. Copy of advertisement of 1895 Annual, with list of 12 prominent agricultural papers of the country, to which the same was sent, for insertion, with letter accompanying.

No. 7. A list of ten leading agricultural papers of the country to which Complimentary copy of the Annual was sent, with letter accompanying.

Exhibit 2. Accompanying, shows the advertising matter issued in this connection, after announcement of the Annual meeting, as follows:

No. 8. Secretary's Circular "X-32" announcing to paid members for 1896, that credentials for next meeting would be sent in due time.

No. 9. Press proof of Ruralist's notice of 1895 Annual.

No. 10. Circular—"Why not take a Life Membership?"

No. 11. Announcement of Ninth Annual Meeting.

No 12. Circular letter in three forms, calling attention to Ninth Annual Meeting.

No. 13. Form of letter to State press announcing Ninth Annual Meeting.

No 14. Joint announcement of Ninth Annual Meeting by Reception Committee and the Jacksonville Board of Trade.

THE PRESS.

Exhibit 3. Accompanying, contains such notices by the State press of the Society, its Annual Meeting and Annual Report, as have been filed with the Secretary.

In this connection, I would call the attention of the Society to the importance of a proper recognition of the courtesies extended the Society by the State press—of its efforts to promote the Society's welfare, and its generous assistance in carrying out the Society's objects.

NECROLOGY.

The Secretary has been advised of the death of five members since the last Annual Meeting, as follows:

J. W. Cook, Okahumpka.
Chas. W. Hawkins, Georgetown.
D. Greenleaf, Jacksonville.
John L. Rush, New Smryna.
Rev. John W. Harding, Ormond, and Long Meadow, Mass.

MEMBERSHIP.

I take pleasure in reporting that the membership is in a most satisfactory condition, and steadily increasing. In 1893 the annual membership reached a total of

248, there being no Life and no Honorary members. In 1894 the total membership reached the following figures:

Honorary	2
Life	13
Annual, (and fully paid)	370
Total	385

In 1895 the membership reached the following figures:

Honorary	2
Life	11
Annual (fully paid)	464
Total	477

Today, May 7th, the Society has:

Honorary members	2
Life members	19
Annual members (fully paid)	351
Total	372

One year ago, May 7th, 1895, the Secretary reported a membership as follows:

Honorary	2
Life	12
Annual (fully paid)	304
Total	318

From the foregoing figures, it will be seen that the year, ending May 7th, 1896, the gain has been as follows:

Annual	47
Life	7
Total	54

It will be noted that 161 members were added to the membership for 1895, subsequent to the 1895 Annual Meeting, and it is altogether likely that a corresponding increase for this year, will bring the 1896 membership to a total of 500 or more.

FINANCIAL.

Total amount collected for account of the Society from May 7th, 1895 to May 7th, 1896 ..... $663.00

As follows:

Dues for 1894	$ 1.00	
Dues for 1895	182.00	
Dues for 1896	325.00	
Dues for 1897	1.00	
Life Memberships	70.00	
Extra Copies of 1895-Report	4.00	
Donations	80.00	$663.00
On February 12, 1896, turned over to Treasurer		$256.00
On hand for Treasurer's account		407.00
		$663.00

Respectfully submitted,

A. H. Manville,
Secretary.

TREASURER'S ANNUAL REPORT.

[SEE MINUTES PAGES 1 TO 6, ITEM 8.]

1896.					
Cash on hand as per last report...		$222.83			
Feb. 12. Rec'd from Sec'y Manville.....		256.00			
		478 83			
CONTRA.					
Feb. 12. Paid Secretary's Draft No 6.....			Telegram	3.66	
Freight and expenses paid by Secretary....	10.53		Postage stamps.....	56.00	
Stationery and incidentals at annual meeting.....	1.97		S. F. Hall, ptg circular letter	4.00	
Expenses of trip to Jacksonville to confer with printer in regard to report.....	5.00		E. O. Painter & Co on Report.....	100.00	
Registration and postage.....	26		Drew & Co. printing and stationery.....	24.70	209.72
Postage and mailing letters to delinquents	3.60		Mar. 21. Paid Sec'y Draft No 7 E O Painter to bal. acc't.....	101.30	
			Exchange on Draft..	25	101.55
					311.27
			Bal. on hand.....		167.56
			The Secretary (who read the Treasurer's Report—the latter not being present at the meeting) stated that he (the Secretary) had on hand for account of the Treasurer.....		407.00
			Making the total on hand.....		574.56

Respectfully submitted,

J. B. Anderson,
Treasurer.

EXECUTIVE COMMITTEE'S ANNUAL REPORT.

[SEE MINUTES PAGES 1 TO 6, ITEMS 16 AND 24.]

The Executive Committee has held but one meeting since the last annual meeting, and this was at Jacksonville, Feb. 12th, 1896, at which were present W. S. Hart, E. S. Hubbard, members; A. H. Manville, Secretary; J. B. Anderson, Treasurer; and C. F. A. Bielby, Chairman of the Committee on Transportation. At this meeting the Secretary's bills for running expenses were examined and approved, and the Secretary authorized to make a draft on the Treasurer for the expense of printing the report. As some of the 1895 Annuals remained on hand, the Secretary was authorized to sell the reports to parties not desiring membership at $1.00 each, expending the sum of $30.00 in advertising these Annuals in Northern papers as handbooks of information.

The date of the annual meeting was set, and the Secretary instructed to make out the programme for the meeting on the same general lines as last year.

Mr. Bielby, Chairman of the Transportation Committee, was requested to arrange for railroad transportation, if possible, at last year's rate of one cent per mile. Mr. T. H. Livingston, Secretary of the Jacksonville Board of Trade, met the Committee by invitation, and a conference

was held regarding arrangements for the next annual meeting. A local committee of arrangements was appointed, consisting of Messrs. John E. Stillman, Lorenzo A. Wilson and Stephen Powers.

The Secretary was authorized to arrange for a stenographer, printing and such incidental expenses as he deemed necessary in preparing for the next annual meeting. The Committee then adjourned sine die.

At the meeting held May 5th, 1896, the Executive Committee to safeguard the perpetuity of the Society, voted to recommend the adoption of an additional article to the Constitution, as follows: Amendment to Art. 7: An amendment to the Constitution, and by-laws shall be proposed at one annual meeting, and voted on at the next annual meeting, unless unanimous consent is given to its immediate consideration.

Lyman Phelps, Chairman.
E. S. Hubbard,
W. S. Hart,
Executive Committee.

DISCUSSION.

(The discussion given below followed the reading of the Executive Committee's Report).

Lyman Phelps: I move that the recommendation of the Executive Committee be voted on by the Society.

D. O. Davies: I think the form of this amendment should be, resolved that Art. 7 of the Constitution be amended by the addition of the following section, and that would leave the vote two-thirds as it now stands, and not require, except in emergencies this modification of it. I think the Executive Committee has made a wise suggestion, we ought to go slow in amending the Constitution, and this proposed amendment would be an effectual check upon undue haste in changing our original law. I move that the article be recommitted to the Executive Committee that they may give it proper form. Carried.

During the afternoon session of the second day (see minutes on page 1, item 24). The Executive Committee reported on the amendment to the Constitution as suggested in Mr. Davies' motion. The amendment was adopted, and article 7 now reads,

Article 7. Section 1. The Constitution may be amended by a vote of two-thirds of the members present.

Section 2. An amendment to the Constitution and by-laws shall be proposed at one annual meeting and voted on at the next annual meeting unless unanimous consent is given to its immediate consideration.

THE WEATHER BUREAU.

Its Importance and Relations to the Producers of Florida.

By A. J. Mitchell, of Jacksonville, Section Director, Climate and Crop Service of Florida, United States Weather Bureau.—Paper prepared at the special request of the Society, and read by the Author.

[SEE MINUTES PAGES 1 TO 6, ITEM 48.]

Availing myself of the kind invitation of your Secretary to submit some observations upon the weather bureau in its relation to the interests of Florida, I shall ask your indulgence for a short period while a cursory review is made along the line indicated.

To begin with, may we not ask, pertinently, if there is anything under the sun not affected by the weather? The ancients were cognizant of the fact that nearly all things—animate or inanimate—possessed some element tending to elucidate the complex question of foretelling weather changes, and today the superstitious are fruitful with their signs and sayings, applicable alike to the animal and vegetable world. Like the days of effete monarchies, however, mythological and astrological matters have disappeared, and the sunlight of advanced thought has evolved more tangible and plausible theories. The far reaching effects that the weather sustains to personal comfort, and its almost indissoluble relation to the welfare of peoples and nations, are sufficient explanations for the present energetic, liberal and sagacious action of the leading nations in maintaining weather bureaux. Is there anything that so thoroughly permeates every nook and corner of the universe, and invades alike the hovel of the humble and the palace of the rich? That falls with equal force upon the beggar in tatters upon the street, and the crowned head who rules "by divine authority?" By its captious freaks the exchequer of one is filled by absorbing the holdings of another, for the coal and wood dealer looks on with "ghoulish glee" upon the advent of these great anti-cyclonic waves of cold air as they sweep in resistless fury from ocean to ocean, enveloping a continent in their icy embrace, while the fruit grower is fervent in his beseechings for the mellow air of Spring, but pays as tribute the accumulations of a lifetime.

The Florida hotel keeper scans the weather chart or daily paper, and mentally counts his guests riding southward upon the crest of frosty air, or perchance, in summer, his eager eye faileth not in seeing an advancing hot wave, knowing that increasing caloric multiplies the seashore's numbers. On the other hand, the farmer's face is the picture of anxiety, for the blizzard robs him of the fruits of a summer's toil, while the hot winds of the latter season reduce to a minimum the possibilities of Nature's yield. Whether you be within the confines of the north, or beneath the azure skies of Florida, the weather intensifies or ameliorates the condition of the human race, and leaves its

impress upon all matter within the realms of space.

Recognizing these facts, Congress established the Weather Service some 25 years ago as an adjunct of the War Department. Some four years ago it was transferred to the Department of Agriculture, and less than twelve months since, Prof. Willis L. Moore, then on duty at Chicago, became the executive and controlling spirit of all the weather—good and bad—in the United States. It is but reflecting a universal tribute to say that at no previous time was the bureau so efficient, due to the present Chief's ripe experience and astute knowledge as a practical forecaster. Though it may seem otherwise to the untutored, yet, the duties of a forecaster are sometimes multitudinous, and always exacting. With his chart before him, he may see an immense area of cold air rushing eastward from the Rocky Mountain Slope, threatening destruction to millions of property, and causing much discomfort and suffering to the nation. At the same time there may be evidences of a storm formation in the Gulf or South Atlantic, the development and eastward movement of which would endanger, if not destroy, the carriers of the nation's commerce. With these complex conditions before him, and with less than a minute's time to devote to each state, cold wave signals must be ordered for one section; frost warnings for another, while the storm's fury must not be ignored. This duty is performed each day—sometimes twice and thrice—during the year. There are legal holidays and Sundays; they come and go with the passing years, but the weather man knoweth them not.

I fully realize the fact that cold wave and frost warnings for Florida are of paramount importance—probably not second in value to the warnings of those great meteors that, originating several degrees north of the equator, sometimes sweep our coast from Key West to Portland. I would not have you think that forecasting was the only duty imposed upon the weather bureau. Far from it. There are other requirements no less exacting. Nearly every state or section has duties peculiar to its needs.

During the growing season, or more properly from April to November, those states recognized as the Cotton Belt, have special services for the benefit of the cotton interests and each morning there are posted in the various business exchanges, particularly the chambers of commerce and cotton exchanges, the maximo and minimo temperatures, with the precipitation during the preceding 24 hours. These are centers to which the sub-stations report by telegraph. With these elements given each day, those interested are enabled to make proper deductions as to crop conditions. Similar service will soon be inaugurated for the great corn an wheat districts of the west.

On assuming charge of this station about one year ago, I recommended the establishment of a system of fruit belt reports, which was favorably received by the Chief of Bureau, and will doubtless be put into effect when the fruit interests shall have been restored to normal conditions. Louisiana already enjoys a service of this character with especial reference to her cane and rice interests.

While other states have received attention, Florida has not been neglected, and it is Prof. Moore's earnest desire to make advances wherever the same may prove

advantageous and profitable to the people.

With reference to Florida, let us see what has been done during the past year. A policy of expansion has characterized the management of the service in this State, as evidenced by the following figures. During the past winter more than one thousand frost and cold wave warnings were issued from the office in this city; sent by telegraph to about 100 well selected offices, these duplicating the warnings to near by offices by the first mail. If every distributing center for the daily forecast and frost warnings duplicated and forwarded the information, there went forth from the various sources 114,515 messages and cards concerning the weather. Aside from this, all railroads, and river steamers were furnished the warnings when their respective sections were threatened, which largely augmented the information disseminated. Through the liberal and progressive management of the F. C. & P. R. R., Capt. D. E. Maxwell adopted a frost whistle signal which was useful, and will become more so in the future. This is regarded as an exceedingly valuable medium to reach stations isolated from telegraph sources. There are many advantages, apart from the benefits arising in protection to vegetation, to be realized from the knowledge of cold waves, chief among which I may mention the regulation of fruit shipments. No small quantity of fruit is either badly damaged or destroyed by leaving Florida at an improper time; in other words, just when a severe cold wave is advancing. Such losses can be reduced to a minimum by a proper observance of weather conditions, and making preparations therefor. This knowledge was highly appreciated and utilized by importers of bananas at Mobile while I was stationed there last year. On Sundays a special message was received at the Weather Bureau giving the temperature and weather conditions through the central valleys. Mobile is one of the largest if not the largest, banana port in the country, and during the winter the weather is no small factor in regulating the traffic. That which is applicable to Mobile is no less so to the cities of Florida.

The weather service and the weather man are objects against which the would-be wit sometimes makes sallies, but as he usually fires a blank cartridge, no damage is done. We invite criticism, especially that born of a desire to increase the benefits to the people, and I hope the members of this association, representing as they do, that element of producers for whom the service was primarily established, will not hesitate to offer suggestions which are designed to enlarge the sphere of usefulness. A few hints from me may not be inappropriate.

During the summer—with some—the rules governing the forecasts are forgotten, else the knowledge of them is permitted to remain in a comatose state, so to speak, until revived by the first frost of winter, then only in a hazy or nebulous condition. They forget the conditions under which "stationary temperature" is omitted from the forecasts, and during the past winter, this slight inattention on the part of the beneficiaries was, to my knowledge, the cause of several thousand dollars being lost.

There is no state in the Union the products of which are more susceptible to the changing meteorological conditions than Florida, and it behooves all to be alert; ever watchful that the necessary protection may be available in case of need. And

while on this line of thought, it may not be superfluous to digress a little, and refer to the importance of giving protection to vegetables and other tender plants in case of frosts. The matter is being much agitated in California, and we are not unmindful of the fact that proper provision would be opportune here. There is a great diversity of opinion as to the best method, but I am satisfied that irrigation, flooding, if possible, with the addition of wet smudges will produce excellent results. He who is always prepared for such emergencies will eventually reap the benefits of his sagacity. The greatest impediment in the way of realizing the fullest benefits from warnings of frosts and cold waves, is found in the imperfect medium of comunication, and to ameliorate this unsatisfactory condition, there should be some concerted action with a view to distributing the warnings to adjacent or country districts remote from telegraphic centers. In some sections, I think this plan is in operation. The necessity of it is certainly apparent.

Second only in importance to the daily forecasts, frost and cold wave warnings, comes the compiling of climatic data for the State. This important work is rendered possible by the hearty co-operation of voluntary observers; and let me emphasize the fact that no more potent influence and convincing argument can be presented in behalf of the State than the records of her climate; and if every immigration agent for the State or railroads is desirous of achieving the greatest success, let him set forth the official data in tabulated form denying the erroneous but unfortunately very prevalent belief that, during summer, Florida is the shortest route to hades. Eradicate this belief, and immigration will increase with which comes the demand for lands, and therein you will feel the impetus to increased busines life. Some of the western states publish climatic data monthly, and all possible resources are being worked at high pressure in setting forth the advantages of their sections. There are always demands on the weather bureau for climatic data of Florida, and just the other day some were sent to England. There should, however, be some organized effort made by the State, for it is out of the province of the Weather Bureau to supply more than random calls. From the climate of a state are reflected her resources, industries, and character of her people.

I am reminded that, at the Atlanta Exposition, several states exhibited conspicuously their average temperatures and rainfall, and other climatic features, much to their advantage, while Florida ignored her trump card, being represented only in the august amphibious personage of a St. Johns River alligator. However, it was effective argument in favor of a tropical clime.

In this age of progress and scientific attainments, there is no class upon whom it is more incumbent to live abreast of the times than the producers of the country. Every invention or discovery seems to open wider the field of possibilities. It is only a few years since agricultural chemistry was recognized as an important factor in successful farming; and the scientific specialist, the entomologist, as playing an important part in the destruction of that almost invisible army that lays waste the rich fields of the planter.

It is no less true of the Weather Bureau. It is yet in an embryonic state. As soon as our knowledge is more perfect as regards the part played by the upper air cur-

rents in the formation and progress of storms, I feel assured that the bureau will be able to foretell with all reasonable accuracy, and herald perhaps days in advance, the extent and severity of all storms. Surely it is more reasonable to anticipate this advance with the history of the past before us, than a few years ago to have expected the now recognized achievements in electricity.

Among the auxiliary duties now devolving upon the Weather Bureau, are the collection and summarizing of weekly crop statistics during the growing season. These reports are collected each Monday, condensed and telegraphed to Washington, where a general synopsis of crop conditions in each state is given the press, and by Wednesday morning the information is lodged in every city and town throughout the country.

Based upon the above data, weekly crop bulletins are issued from both the state and national centers. The national bulletin not only gives the crop conditions, but also the mean and normal temperature and rainfall for the week with the departures. Every intelligent farmer should receive these bulletins, from which he gleans important knowledge of the condition of those crops in other states with which he has to compete. Business houses in farming centers largely regulate their supplies to consumers by the above information. From the State bulletin for this week we learn that less solicitude may be had for oranges; to paraphrase, they are signaling: "Keep up your courage, for we are coming."

We need have no fear for Florida; true, she has had her freezes; not more, perhaps, than a rival sister state, but with her usually uniform temperature and rainfall; with her incomparable geographical location, and bathed on either side by the tepid waters of gulf and ocean, she still remains the gem in the Union of states.

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*IS OUR CLIMATE CHANGING?

Historical and Meteorogical Evidence Bearing on This Point.

Remarks by George R. Fairbanks, (author of "Fairbanks' History of Florida," "Florida Freezes," etc.), and by A. J. Mitchell, (Director for Florida, of the U. S. Weather Bureau).

[SEE MINUTES PAGES 1 TO 6, ITEMS 12 AND 49.]

George R. Fairbanks: With reference to the subject of cold, I have come across a very interesting old book, which seems to indicate that instead of our seasons growing colder, as a great many people think, cold seasons seem to work in cycles, in a certain number of years there will be the same amount of cold. I hold in my hand a little old book giving account of a party who were shipwrecked on the

*NOTE—For further and fuller information as to the climatological history of Florida, see "Florida Freezes—The Greater and Lesser Freezes in Florida for a Century and a Half," by Geo. R. Fairbanks, in the 1895 Annual of the Society, to which the remarks by the same author under the above head are a sort of addenda.—The Secretary.

coast of Florida in the year 1696 near Lake Worth. After being robbed by the Indians, and nearly starved to death, they reached the Spanish outposts. As they slowly traveled along the coast one of the miseries the author attaches most importance to was the severe cold weather, and states that several of the party perished of cold on the east coast of Florida. They finally arrived in St. Augustine, and under the head of the 16th of the 9th month, which would be September, 1696, and allowing for the old style would bring it about the 1st of October, he says: "This morning we had ice half an inch thick, and it has been so for some days past, but the sun arose and dissolved it." So it seems that in the month of October, 1696, they had ice half an inch thick. I think it just possible there is an error in the date, the Journal is from July to January, and the title page of the book is: "Narrative of a shipwreck near the coast of Florida, showing God's protecting Providence, faithfully related by one of the persons concerned therein." I think it hardly probable this man would have kept this Journal daily under all the hardships to which he was exposed, and he probably wrote it up from memory; at all events he cannot be very much out as to the time of year.

C. A. Bacon: I think it must have been the 7th of February, just two hundred years to a day, before our big freeze, the 7th of February, 1695, and the 7th of February, 1895; I think this was probably 200 years previously; he is out on the dates. Let us call it so, and risk it.

[The foregoing discussion occurred at the morning session of the second day; the remarks which follow were made at a subsequent session, namely, at the morning session of the third day.]

[SEE MINUTES PAGES 1 TO 6, ITEM 48]

A. J. Mitchell: It is a very prevalent and erroneous notion that our climate is changing. Of course, we are a young nation, and our meteorological records do not extend beyond a few years; however, we have an established record more than one hundred years old. So far as meteorological data go there is nothing to show that the climate of Florida is changing. We have observations in Florida since 1825, and I mean by that official observations, of course. The first observations were by the army officers; they were required to make these observations, and consequently we have records considerably over one hundred years old, and all going to disprove any asertion, insinuation, innuendo, or otherwise, that the climate is changing. And it is here I want to make a point. With the past freezes and with this suspicion that the climate is changing, and that some 1600 years ago they had icebergs in the St. Johns River, and men were frozen to death in St. Augustine, that is impossible. The conditions that would cause such a state of affairs in St. Augustine in September, would be preceded by a storm the fury of which would have devastated this continent. A blizzard from the northwest to Florida in September, would have reached here almost at the time of maximum heat of summer; think how cold it must be in order to do that. If we had that in St. Augustine, what do you suppose it was in the eastern portion of the country, in the Boston section. I say that is not feasible. There is no question in my mind but what the date is erroneous,

and likely the degree of cold is exaggerated. [Here Mr. Mitchell read data showing the changes in temperature.] Take the average and you find about one degree difference since 1825. It is truly in that case a condition and not a theory that causes these abnormal departures. Man cuts down the woods and forests and destroys what nature has planted there, and what nature has provided to protect him; denudes the forests and enables these cold winds to come in from the north, and do their damage, and he infers that the climate is getting colder. He forgets that he destroys what nature has provided to prevent this, and makes no provision against it. The temperature is the same. Man makes the attack of the cold weather more successful by his operations and by his failure to substitute anything for them.

PROTECTING ORANGE GROVES FROM COLD.

Practical Experience with Wood, Resin and Oil Fires, and "Smudges."—Introducing Steam into the Groves.—How Protecting Against Frosts Differs from Protecting Against Freezes.

"Ad Interim" Remarks by D. O Davies, of Fernandina, Nassau county, with discussion following. Also remarks by A. J. Mitchell (Director for Florida U. S. Weather Bureau) with discussion following.

[SEE MINUTES PAGES 1 TO 6, ITEMS 20 AND 49.]

D. O. Davies: As most of you do not know me, a few words of introduction may not be amiss. I have been an orange grower and seller for fifteen years. Never missed a crop—not even last season. Unfortunately that crop was small. My grove is in Lake county on the Ocklawaha river half way between Lakes Eustis and Griffin. And that you may know I am disposed "to keep up with the procession," steam irrigation was introduced into my grove in 1884. The pipes are so arranged that Ocklawaha river water can reach every tree.

I think I have a message for the orange growers of Florida. The great question I have in mind this morning is, How shall we protect our groves from cold? It has become a vital question. In the olden times killing frosts were rare, separated by long intervals. But even then they caught it occasionally. Major Fairbanks recently handed me a curious little book, a story of shipwreck on the Florida coast in 1696 On page 85 it is stated that several persons perished from cold late in September. Of course they were already much exhausted. The writer says, there was ice in St. Augustine that September morning, half an inch thick, as there had been on the three preceding mornings. In 1835 was the last extreme cold until 1886. We had three days freezing cold in 1886 though not so severe as in 1895.These "cold spells" would seem to be growing more frequent—due in part to the deforesting of our own and other states; due also, in chief part perhaps, to our world's passing through what the astronomers call "cold vortices of space."

In February, 1895, we must have gotten into a very cold vortex.

We are shut off from many methods that may be successfully used elsewhere, under different conditions, such as vapor baths, lamps, small kerosene furnaces and so on. Without exception our cold periods are accompanied by very high winds, from 30 to 60 and 70 miles an hour. When the wind falls, the temperature rises, as a rule. These fierce winds would blow the vapor away, blow out the little lamps and furnaces probably; or at the best would keep the heat at ground surface. No heat under such circumstances could reach your tree tops, the very place you want the heat, as well as along the ground. Dismissing all these plans as unsuited to our conditions, however successful they may be elsewhere, what for us is the practical method? It is primitive and simple—as simple as it is effective.

Here is the method: On the north and west sides of your grove have what may be called conflagrations, big fires that will send billows of heat rolling between and over your tree tops; and all through your grove, at short distances, have small fires to help on the good result. "Very simple!" Yes, and so are most successful things. The simpler the better. Here now is the demonstration. In the freeze of Feb. '95 the plan was used in my grove, though my instructions were not fully carried out, the big fires to northwest not having been large enough. By actual observation, the same thermometer being used, west of the fires the marking was 18 degrees while at the eastern edge of grove the marking was 33 degrees, a difference of fifteen degrees.

We saved our trees, as will be explained later. All around us north, south, east and west, the trees were killed to the ground, with few if any exception. I do not know of any exceptions. We saved from eight to 12 feet of the upright bud and from four to eight or ten feet of larger branches. Even as it was, the loss was needlessly large, from failure to carry out my instructions.

Mr. Z. T. Alsobrook and I own a natural grove of 15 or 16 acres. Two brothers made and then divided the grove. I bought Mr. Peter Alsobrook's part. But in these remarks, it is treated as one grove. Such it is practically. In the last great freeze, my manager asked Mr. Alsobrook to join him in firing. They went to work and for three days and three nights worked like Trojans. They did well and achieved a real success. Where they failed at all it was because of failure to carry out my instructions. The chief point of failure was in not having real conflagrations to the northwest of the grove. Had they followed my instructions they would have saved about $20,000 actual value, and they would have secured a handsome income last year and this year—much larger than was, or will be the case. If they had spent $3,000 instead of $300 that would have been the result.

Question. Is it your opinion 18 was the lowest temperature at that time? Is it the fact orange groves in different localities will stand different temperatures?

Mr. Davies: The lowest seen was 18 degrees. Probably the cold went a degree or two lower, 17 degrees probably, 16 degrees possibly.

No doubt orange groves in different localities will stand different temperatures. Environment would explain this. Altitude of land, character of soil, water or forest protection and so on would make a difference. But in such a freeze as that of Feb. '95 mere difference of locality could make

little if any difference in result. In very rare cases of peculiarly favorable conditions, there might be some difference. As stated above, all the groves around us east, west, north and south were cut down to the ground. I do not think there is a living tree in that whole region, except those saved by fire. There may be some. I know of none. I say "in that region." I have heard of a few near Tavares and at Drake's Point on Lake Harris.

It is a perfect protection. You need large fires. People say, "You will burn your trees." Well, suppose I do burn 100 trees in saving 900, would it not be a wise thing to do? But there need be no such destruction if the business be judiciously managed.

Three things are requisite to the success of the plan. 1st. Ample preparation. You must get ready and keep ready all the time for the freeze. Once it has come, there will be no time for gathering materials for fire. Your fuel must be on hand and plenty of it. 2nd. Prompt application. The sooner begun when the freeze is on, so much the better. If possible keep the trees from getting chilled at the start. In such cases, a chill is almost as bad for an orange tree as for a convalescent. It makes the issue less certain, giving advantage to the foe. No delay. 3rd. Perseverance till all danger is past. This of course is essential. In 1886 I lost a fine crop of oranges by my manager's failure to keep fuel supplied. They had done well for two days and three quarters. At midnight of the last day, there was not a frozen orange in the grove. At 7 o'clock the next morning, there was not one unfrozen. A few hours failure of fuel did the work. Just a little more fuel, just a little longer continuance of the fires, and all would have been well. So in saving groves, there must be no cessation, no giving up until the victory is won. It must be a "fight to the finish." The plan might be named Plan of the three P's--Preparation, Promptness, Perseverance.

Question. Say the grove is shut in northwest of you; they wont go in with you?

Mr. Davies: Go it alone. Go on your own line and do it yourself. We have trees in our grove now you could not put in this room, magnificent heads on them. Whatever saving of that grove of 15 acres was accomplished was done by fires which were so insufficiently conducted, not at all what had been ordered, not at all what was needed, but you see the result. My man said, I see what a little did, and I will take care next time you wont lose a tree. Fire!

Question. Do the winters in Kentucky grow colder as we suppose in Florida?

Governor Dickson remarked to me that was a fact. I am too young a man as you see, to have any knowledge of it. Governor Dickson, who came from North Carolina at the beginning of this century and lived in Kentucky 78 years more or less, told me, he had observed the gradual increase of the cold from some cause. They have been opening up the country by clearing the forests, so that over the prairies of Illinois and other northwestern states sweeping blizzards rush down now meeting almost no obstruction. Not many years ago I walked across the Ohio river on ice 12 inches thick.

I am inclined to take the view of astronomers, who say we have been passing through cycles of cold vortices in space; and we are passing out of them now, so that about the time those sprouts are coming in we shall get out of those freezing vortices, and shall have mild winters again.

I am hopeful of the future. I will tell you a thing in confidence. I am going to bring forth fruits showing my faith. I am going down to make arrangements to quadruple my grove on that same line, and it is largely on my faith in the partial success of my experiment, in the faith it will never be hurt as long as I can keep fires burning there. Florida may become a little sort of Gehenna, and perhaps it would save some of those words, which are heard and have the ring of Tophet about them.

Question. You believe it was the heat from the smoke or the heat from the blaze on the trees on the outer border?

Mr. Davies: It was the actual heat.

Question. It was not the smoke?

Mr. Davies: Smoke is mainly unconsumed carbon. The smoke would be worth nothing unless it conveyed heat. Whatever heat was in the smoke helped to do the work.

Question. Did you build small fires in the center of your grove?

Mr. Davies: All through the grove.

Question. Did you find that the small fires hurt your trees through the center.

Mr. Davies: I do not think a tree was injured.

Question. A wild fire in the grove and woods would hold more heat than we could stand, I have found.

Mr. Davies: Ours were all tame fires, we had them under perfect control.

Question. Do you think you would get as much benefit from kerosene and sawdust as from wood?

Mr. Davies: Yes, in some respects more. It is a more expensive way.

Mr. H. B. Stevens: I have had considerable experience in the same line. We have been trying fires every freeze we have had since '76, and I observed last February in the very cold weather, the orange trees didn't burn as easily as formerly. The blaze went right through one tree; a tree about the size the Doctor speaks of, and it was not destroyed, not even scorched by that blaze. I have found the best way to carry on intermediate fires through the groves is by using the cheapest grade of rosin you can get. In that way one man can attend to five acres. I enveloped it in paper packages. Six pounds of rosin will burn about one hour without any attention and give you good heat and smoke, and the cheaper the rosin the better it will burn. The high grade rosin will burn like a flash, like turpentine, burn too quick. You can set it within two feet of the tree and not hurt the tree at all, provided your limbs are not within two feet of the fire. In February we burned rosin in iron pots. We found when the iron got hot we had to fill them up oftener because it made the rosin burn faster. So I tried paper packages; it takes six pounds to the hour, and nine pounds to the hour in pots. The idea the Doctor suggests of having a large fire to the west or northwest is good, but you can not always do it; it takes an awful sight of expense to get it ready; it takes an army of men, especially if you have a large grove. I take common hardware paper, and then give it a coat of paint. I make it six inches in diameter and six inches high and make it in a cone shape. You set the rosin on fire at the top, the sides will remain firm. You must paint it because the rosin will dissolve the paper. There is a little secret about setting it afire; you must set fire to it very quickly. You must pulverize your rosin on top, and take a piece of oil waste and drop it in and set fire.

Mr. Davies: Of course, what we want is heat; you get it from kerosene, rosin or wood, pine or oak. In some cases rosin

would be cheaper and more convenient; in other cases crude kerosene would be cheaper; in some cases wood, which is especially cheap. The thing you want is heat.

Mr. Stevens: I would like to make one comment on crude kerosene. You know the smut of the white fly on the orange; the smoke from the crude kerosene is as bad as that. A party in California used it. I watched it with great interest, and I wrote to the Earle Fruit Co., to report to me the result, how it came out. He set fire to his crude kerosene, and his neighbor sued him for damages for smutting his fruit.

Mr. Davies: That was a bad game of smut, wasn't it? If that is a true statement it is a very serious objection. How did they burn the kerosene? If you mingle it with saw-dust it is of slower and more complete combustion. If this objection can be truthfully urged against the use of crude kerosene, then I say don't use it; I am a convert to rosin at much more expense. I believe it is much more expensive. You want heat. I don't care how you get it. I don't want any white fly on my groves. The second remark I have to make is about this. Mr. Stevens said, it is one thing to take care of 15 acres and another thing 1,500. I would undertake to give your grove of 1,500 acres relief cheaper per acre and much more successfully than I would 15 acres. Fortunately in February a year ago not many had 1,500 acre groves, but we had groves of 15 acres, and the point of interest is, how to take care of fifteen acres. When you go into it wholesale for the purchase of your material you can do it cheaper and better than you can at retail, and I would undertake to protect an 800 acre grove at a pro rata per acre much lower than I would a 15 or 20 acre grove. We can protect our small groves. So far as I now can see, they must be saved by fire. And it can be done on the rule of three P's —Preparation Promptness, Perseverance.

[The foregoing discussion occurred at the close of the morning session of the second day; the discussion which follows upon the same subject took place at a subsequent session, namely, following Director Mitchell's paper on "The Weather Bureau," during the morning session of the third day.]

[SEE MINUTES PAGES 1 TO 6, ITEM 48]

A.J. Mitchell: There is another thing, that of protection from frost. This is a very important matter to vegetable growers, perhaps not so largely so to the orange interests. I think by the use of smudges; smudges wet and burning keep up a good smoke; the cold air comes in from either side, expanding goes up over this moist smudge and gets in contact with the colder air and that way gives you a fog. If we had the preparations sufficiently extensive I don't think any frosts would hurt vegetables.

C. A. Bacon: You speak of cutting off timber, why does the cutting of the timber when we have none higher than 75 feet, why does that increase the cold one hundred feet higher than the timber; why does it increase the cold above it?

Mr. Mitchell: The cold air always settles in the low places if it is not out of all proportion. All elevated points are comparatively free from injury, the cold air settles near the earth and damages the low places. The denudation of the forests has a tendency to facilitate evaporation, and to that extent I am satisfied affects the weath-

er. As a rule, I say, it is a recognized fact, there is no climate in the world being changed so far as science is able to make investigation.

L. Montgomery: You speak of smudges, a fire built with something wet over it?

Mr. Mitchell: Anything that will produce smoke.

Mr. Montgomery: Is smoke better than fire?

Mr. Mitchell: The idea is to keep the heat near the earth, to prevent radiation; it keeps the heat near the ground.

A member. If you knew cool weather was coming tonight and tomorrow night and so on and last three days, do you suppose saving the first night would have any beneficial effect for the following nights?

Mr. Mitchell: It would so far as frost is concerned. We want to know when it is going to freeze. We can have frost at 47, but we must have a temperature of 32 before we have a freeze, and there is a misunderstanding between the temperature necessary for frost and ice. Should you flood a district a night or two in advance of the frost it will be a very good prevention against it. That has been illustrated in the cranberry sections of Wisconsin; it is a good idea to flood wherever possible, and better to have this smudge; it warms the air.

A member: I suppose that would be ineffective where you have a high wind?

Mr. Mitchell: I speak particularly of tender vegetables that we have in the early spring. Prevention of that kind would certainly save vegetables.

Geo. H. Wright: Recently there have been some tests made in California in regard to the smudge or protection by fire heat side by side. I have a very fine article at home on this subject. I forgot to bring it with me. I intended to. But Mr. Montgomery inquired about smudges. It is said in California that the fire heat is preferable to smudge when it gets to a freeze. The simple conditions of frost and freeze are generally understood. If it gets to freeze with wind, fire heat is what is wanted. I think this article is more scientific and goes to the bottom better than anything I have read. The smudge is constantly rising and don't reach the cold. The writer shows just how this cold air is brought in by winds and how it may be prevented from injury by fire heat. He hung a thermometer in a tree and it indicated 28 degrees, and 27 yards to the southeast or to the leeward he makes his one center fire and he raises that thermometer to the windward over 70 feet or thereabout to 33 degrees. I don't know the size of this fire, that he fails to give. There was scarcely any wind; there was no wind blowing that was perceptible. He was comparing fire heat with smudges under certain circumstances. That is why I say we must not rely on a smudge under all circumstances; if there is wind we want a fire heat to take its place.

Mr. Montgomery: Does that strike you as reasonable that the thermometer could be raised that much by a small fire so far away?

Mr. Wright: I am not prepared to answer that. I am simply making a statement as he gives it, and as vouched for. He said the fruit was not injured in the last December freeze. I immediately wrote to California to a friend of mine to get at the facts, and I found that it dropped down to 18, and he saved his fruit by that process; of course, he had more than one fire.

Mr. Montgomery: Is that reasonable to

suppose, the thermometer would be effected at that distance to the windward?

A member: Fire would do it, that is perfectly probable.

Mr. Montgomery: Can a man protect his grove in the same way in Florida?

Mr. Wright: I have no doubt in my mind at all, but you have got to have several fires to the acre. I don't say there was but one fire, but the nearest fire was over 70 feet from the thermometer and there was that difference. I give it as I read it, and in connection with the investigation I had been making with fire as compared with smudge heat, I find it wont do to rely on the smudge under all circumstances, that fire must take its place. I believe that you can protect your grove by small fires against any cold we have had in Florida. That is putting it pretty strong.

Prof. H. J. Webber: A scheme has been mentioned to me, which seems to be a new one. It may be old. In following the discussions in the California papers I have noticed it has been mentioned. It is only applicable on a limited scale, that is in connection with irrigation plants. It seems practicable, the experiment seems practicable. The idea is, the steam from the irrigation plant be passed through the pipes all about on the windward side of the grove. A very small amount of steam will cover the ground, and it can be kept up almost indefinitely this way. It seems to me this scheme wherever it is practicable to apply it could be applied and made a success. It has, I believe, been applied in frosts, and also in freezes.

CAMPHOR.

The Result of Experiments in the Cultivation of the Camphor Tree and the Manufacture of Camphor Gum in Florida.

Verbal Report by H. G. Hubbard, of Crescent City, Putnam county, (Special agent of the U. S. Department of Agriculture), submitted at the special request of the Society. With Discussion.

[SEE MINUTES PAGES 1 TO 6, ITEM 35.]

Mr. Hubbard: Mr. President and Gentlemen of theSociety; what I have to say about Camphor production in Florida will take me but a short time. I have been interested in the subject of the production of Camphor in the world at large for the past five or six years.

About that length of time ago the late Mr. A. J. Beach, the well-known nurseryman of San Mateo, and his son Fred Beach, had made a small quantity of camphor from the leaves of camphor laurel grown on their place. They boiled the leaves in a common sugar kettle, covered with a wooden cover and luted with clay. Through the cover they screwed a length of one inch iron pipe, and this pipe they kept cool with water from a flowing well. The solid camphor formed in the pipe, and soon choked it up, so that from time to time they had to

remove the pipe and by ramming it on a board, they obtained a sample of camphor, which although somewhat mixed with impurities was pronounced the genuine article when submitted to the United States Department of Agriculture.

This result led me to seek for information on the subject of camphor production. Most of the published treatises are written in the Dutch language, and the information they give is not very modern and not very encouraging.

Quite recently, however, I learned some facts of importance, which quickened my interest in camphor and which seemed to me to present the subject of its production here in Florida, in a quite new and altogether more favorable light. In the present condition of our orange industries, it seems to me the horticulturists of Florida may well be interested in having another string to their bow, and I therefore present the following facts which I have gleaned concerning the production of camphor here and elsewhere.

Let me first say a few words in regard to the nature of camphor and its importance in the arts. Everybody knows of its important use as a medicine. This has, however, come to be but a drop in the bucket compared with its use in the arts. These uses are every day increasing. The most important perhaps at present is in the manufacture of celluloid, of which it is a necessary ingredient. Again in photography it is an indispensable article. No photographic dry plate can be manufactured without camphor. The peculiar, even unique properties of this gum in combination with other substances in the useful arts, seem to have been only just discovered. By its use the Japanese are beginning to reproduce in laquers and varnishes the properties of the long lost and now precious laquers of their ancient artisans. The camphor oil which is obtained with the gum and which formerly was wasted, and considered of no value, is now worth more than the solid gum, and has become an indispensable article to manufacturers of fine toilet soaps.

Smokeless powder was once manufactured with camphor as its most important ingredient, and were it not for the constantly diminishing supply of camphor, it is probable that its use for this purpose would never be superseded by any other substitute.

The camphor or camphire, of the earlier part of this century was a precious gum produced in small quantities by a tree growing wild in Sumatra and Borneo, the *Dryobalanops camphorae*. This camphor is still sold among the Chinese for more than its weight in gold. The Chinese will use no other than this particular variety. Not many years ago it was discovered that another tree also produced camphor. This tree, the Laurus camphora or as it is now called *Cinamonum camphora* from which the camphor of commerce is now made, grows native in China, Japan and other islands in the China seas.

Following this discovery, some thirty years ago, some of you may remember camphor suddenly dropped in price and for many years it was in common use as a material for keeping moths away from clothing as well as a very universal remedy in liniments, etc. It sank in price to about 15 cents per pound. Of late years, however, it has steadily risen in price and more recently the rise has been very rapid and at last became speculative. The world's supply of this article which was every day becoming more and more necessary to civilized man, began to give out. Speculators at last made a corner in the crude drug and about a year

ago the price was artificially raised to 75 cents per pound. The death of Col. North in London, the chief speculator in this article, has quite recently released and thrown upon the market a temporarily large supply of camphor gum, and the price has fallen at once to about 39 cents. My best judgement is that the staple market value of the gum is at present not far from 45 cents per pound with a tendency to rise rapidly.

The world is looking anxiously for some new source of supply for camphor. In China its production, which used to be considerable has altogether ceased. In Japan only a limited amount of camphor forest remains. This is under government control and the output is very limited. The island of Formosa remains the principal source of supply. The interior of this island used to be one vast camphor forest. The trees there grow to very large size. They are said to reach a height of 150 feet. Of course in such trees the foliage is but a very small part of the whole tree, and is altogether inaccessible until the tree is cut down. As every part of the tree contains camphor and the roots and wood of the trunk contain most of all, the foliage of the tree was naturally neglected entirely in far away Formosa. Only the wood was used in the manufacture of camphor. In getting the camphor therefore the trees were destroyed root and branch.

The most wasteful methods are employed by the natives in these countries. In China the chipped up camphor wood is boiled with water in an iron kettle. The kettle is covered with a sort of conical straw hat. The camphor vapor condenses in the straw hat. In Formosa the camphor wood in the form of chips, is also boiled in an iron pot, but over this is placed an open pot of earthenware which has a perforated bottom and is also filled with straw. The camphor sublimes in this straw. In Japan they had a rather better method, an improvement on that of Formosa. They boiled the chips of camphor wood and roots in an iron pot from which a bamboo tube led into a condensing box, cooled with running water. In all these methods they only got a percentage of the camphor. How much was lost no one knows. The valuable camphor oil was all lost of course. The camphor which they obtained was mixed with straw and dirt. It was packed in boxes lined with lead, like tea and was formerly all or nearly all sent to Amsterdam to be refined. When received it was black and dirty like the West Indian muscovedo sugar, and mixed of course with fragments of straw.

The Amsterdam process of refining was to put some of this impure camphor into a carboy, that is a sort of jug made of glass, in which acids are transported. The carboy was placed on a sand bath over a furnace and gradually heated until the camphor melted and then boiled. In continued boiling the camphor is all vaporized and resublimes in a solid cake in the top of the carboy, while all the dirt is left at the bottom. Long needles are used to keep open the passage for vapor in the neck of the carboy. This method is still in use at Amsterdam, or was a short time ago. In recent years considerable rough camphor has been refined by American chemists at Philadelphia. They use a cast iron dish, very much like an old fashioned Florida baking kettle. This is covered with another shallow dish or pan of sheet iron, about three inches deep inverted over the first, like a cover. In the top of the cover is a round hole an inch in diameter and over this is placed loosely a small cone of sheet iron. The rough camphor is placed in these iron dishes, a row of

20 to 50 of which are placed in a long sand trough over a furnace. They are heated gradually until the camphor boils and the process is then continued at the same temperature until all the camphor has formed in a cake in the cover, leaving the impurities below. The holes must be constantly watched, the cones lifted from time to time, and the vents kept open with a sharp wire.

All these processes were known to me some years ago, but still I hesitated to plant camphor, believing that sooner or later the island of Formosa would fall into the hands of the Japanese, who are famous traders like the Dutch, and who would be sure to turn out camphor more cheaply than we could hope to make it in this country.

Last fall, however, in Washington, I met a gentleman who is much interested in economic questions and especially in the production of camphor. He is, in fact a specialist, attached to the German legation in Washington, engaged in the study of economic questions of this sort. This gentleman, Baron B. R. von Herman, had heard that I was interested in horticulture in Florida, and he asked if the camphor tree would grow in Florida. He stated that the industrial world was anxiously looking for some new source of supply as the old was very nearly exhausted. I answered yes, that in quite an extended experience with introduced plants in Florida, I knew of no tree that would grow better than the camphor. But said I, what about Formosa, can we compete with that island? Baron Herman replied that the camphor forests of Formosa had been nearly all destroyed. He said, "I have only recently returned from Formosa, where I have been investigating the camphor industry. I had interviews with many Europeans who had been superintending the native trade in the far interior. They had returned to the sea coast for lack of business, and reported that in two years, no more camphor will be produced in Formosa."

This very unexpected information greatly revived my interest in camphor. I naturally wished to find out what percentage of the gum our Florida trees contain. After some rather rude, but still I believe quite accurate experiments I am able to state that the leaves and twigs of young camphor trees in Florida contain one pound of the solid refined gum to every seventy-seven pounds of fresh leaves. This is a much greater percentage than has been obtained in India or than has been obtained from leaves imported from Japan. It is the best showing that has been made in any country so far as I can learn.

To obtain this camphor it is not necessary to destroy or even to injure the trees as has been recklessly done elsewhere. A camphor tree will stand pruning back to almost any extent. It makes three growths per year with us. One in April, one in June and a scattering growth in late summer.

The method pursued by my partner, Mr. Goldsmith Williams and myself in our preliminary experiments was a very simple one. We had the covers of two empty lard cans, holding five gallons each, soldered together with a short tin pipe of about 1½ inches diameter. One of these we used as a boiler and the other as a condenser. The boiler was filled with twigs and leaves fresh cut from the trees, enough water added to nearly fill the can and the water was brought to brisk boiling and kept there for half an hour. The other can was kept cool by pouring a stream of water over it. The camphor all sublimed on the underside of

the cover of the condenser in the shape of snow white flakes, absolutely free from impurities of any sort, except that it was wet with condensed steam. The distilled water which collects in the bottom of the condensing can contains some camphor and also the camphor oil, which can be saved by redistillation.

This is a rather slow method of obtaining the camphor. It is, however, a cheap and easy process and can be followed by any one. On a large scale a better method undoubtedly would be to use dry steam. An ordinary steam boiler supplying steam at 90 pounds pressure would give a temperature of 300 degrees. This would drive the camphor from the leaves very quickly and economically. The apparatus required would be a steam boiler of any ordinary sort, connected with a second boiler in which the leaves are enclosed, and connected with this in series, a condensing vat of wood or metal which can be cooled with running water. The condenser might remain unopened and receive repeated charges until nearly or quite filled with camphor.

Camphor leaves if submitted to the action of steam at a temperature of 300 degrees, i. e., at 90 pounds pressure would not retain a trace of the gum after five minutes' treatment. The camphor obtained in this way would be pure as snow. The camphor oil and water which it contained could be removed by pressure in a hydraulic press of very simple construction.

The cultivation of camphor offers some very unusual agricultural advantages. First and foremost is the important fact that it removes absolutely nothing from the soil. The gum is entirely a product of the gases in the atmosphere. If the leaves, after the gum is removed, are returned to the land, nothing is lost. On the contrary there is a constant gain and as in the forest the soil will grow richer year after year. An old camphor plantation therefore, after it has covered the ground will need no fertilizing whatever. The only advantage in fertilizing will be to hasten growth in the young trees.

Another very great advantage is that in Florida the crop can be harvested almost at any time. Except when the plants are in young growth, one season is probably as good as another.

Again, young camphor trees may be made to produce at two and three years from the time they are set. The tree is the densest grower of any I know. There is always considerable inside growth which can be removed not only without detriment, but even with profit to the young tree. This inside growth contains as much or more camphor than the outside growth. In a tree that has been planted three years the inside cuttings will amount to 60 or 80 pounds in the course of the fourth season. At the same time two cuttings of 100 to 150 pounds of leaves each can be obtained from the outside growth of the same tree at that age. In other words they will produce four or five pounds of gum. The trees standing 10 to 12 feet high at the beginning of spring, should not be reduced in size by the cutting.

The camphor tree is quite as hardy as the swamp gums or maples with us. It was hurt by the second freeze of February, 1895, somewhat, and about half the foliage was cut at that time. Some trees were cut to the ground and some were not hurt at all. One need never lose a crop, however, for camphor can as well be made from the frozen leaves, and I don't believe the tree can be killed by frost in our climate. It is not likely, however, that any of us will ever see the leaves frosted again.

In regard to proper methods of cultivation it is impossible to give more than suggestions. For quick returns, perhaps the hedge system will prove best, that is to say trees three or four feet apart in hedge rows 15 feet apart. For ordinary planting, I would suggest plants 15 feet apart in rows 20 feet apart; the intention being to keep the trees cut back to the size of eight or 10 years. Planted in this method I think a plantation in its fourth season should return $300 to $400 per acre, with camphor gum at 40 cents. The fifth season ought to at least double this return.

I have here about 1½ ounces of camphor which we obtained from seven pounds of leaves. It is just as it came from the condenser. You will notice that it is white and pure as snow. It contains no impurities. In this vial I have some of the distilled water which contains some camphor and also camphor oil. This is also taken from the condenser, and is a valuable household liniment and medicine just as it is. The third vial which I will pass around contains the solid camphor gum sublimed from the snow-like wet camphor obtained from the leaves.

DISCUSSION.

(The discussion given below followed Mr. Hubbard's report).

Question. What character of soil is best to produce the camphor tree in Florida?

Mr. Hubbard: We got our best results, from heavy clay soil in Volusia county where we had five year old trees. We got about 900 grains from seven pounds of leaves, from these trees. The camphor tree grows best, however, on our best pine land soil. It responds very quickly to cultivation, but if care is taken will grow on rather poor soil. I have seen camphor trees growing on our scrub lands, but I will not recommend growing camphor trees on sterile soils.

Question. What would you think of low hammock land, moist?

Mr. Hubbard: Camphor will grow admirably on low, wet lands, whether it will grow in water I do not know. It would grow perhaps on overflowed hammocks if the sun light is not let in to destroy the roots.

Question. What would be the proper distance apart to plant them, how many per acre?

Mr. Hubbard: Fifteen feet apart; unless hedge culture is adopted; the trees should be 15 feet apart and 20 feet between the rows.

Question. What is the proper way to propagate, from the cuttings?

It can be done from cuttings only if you have bottom heat, it is easily produced from the fresh seed. The seed sells for $2.50 per pound, and is about the size of allspice. Thorburn & Co., Seedmen, New York, sell it. If dry the seed germinates very slowly.

Geo. H. Wright: I understood you to say that you would not try to use the wood or bark.

Mr. Hubbard: I use leaves and twigs at present. If I had old plantations I might use the wood also.

Mr. Wright: Why would you not use the roots?

Mr. Hubbard: I do not know but possibly it might be found the best way to plant in sections, and after the trees reach the size you determine on, to cut them off, one section each year and use everything. It might not be best to destroy the roots however.

A member: By cutting the camphor tree

in January it will reproduce itself. That is the old process of making camphor as laid down. I have tried the cutting off process in Florida, and I know they will reproduce themselves.

Mr. Hubbard: If you pursue that system you will increase my estimates materially. I have figured on clipping only the surplus leaves.

O. P. Rooks: I have been interested in the subject. I have been looking into the question myself for some years. I have camphor trees 14 years old, 20 feet high. I have thought of planting camphor trees on my place for fences, hoping to utilize the leaves in a commercial way. I was talking with a wholesale druggist in Ocala, and he assured me last week he paid 50 cents a pound for camphor gum, now he is paying 75 cents a pound. I have utilized the leaves of camphor in my poultry business by putting a few handfuls of leaves with the setting hen. I have quite a number of trees that will seed this year, and intend to plant the seed and raise as many plants as I can.

Lyman Phelps: How large camphor trees have you seen in Florida?

Mr. Hubbard: About the height Mr. Rooks states; I had them 20, 22 and 25 feet, the trees that were first sent out by the United States Department of Agriculture, were the largest I had.

Mr. Phelps: There were some trees growing under my care, which stand 70 feet high, and the trunks of some of them are 15 inches in diameter; they were on good pine lands, and had the same care as orange trees had. I have made experiments in distilling the leaves and got nearly one per cent, but at the price I did not think it would pay then.

ORANGES AND CITRUS FRUITS.

Sprouts From the Frozen-Back Trees—How Many Should be Allowed to Grow, and how Should These be Treated?—The Single vs. the Divided Stem.—Best Varieties to Bud.—The Origination of new Varieties.—Influence of Environment on the Characteristics of the Fruit.

"Ad Interim" Remarks by Lyman Phelps, of Sanford, Orange county, with Discussion following.

[SEE MINUTES PAGES 1 TO 6, ITEM 30.]

L. Montgomery: I want to know what to do with our sprouts? How many to leave, how close to the stump to leave them, whether it is best to leave them all and what is the best time to prune out?

Lyman Phelps: As for experience it must be very limited. We have had no such freeze in two decades as we had last winter. In '76 or '75 we did have some trees four inches in diameter cut nearly to the ground by cold. I tried to save the sprouts on many of those and nursed them along for a number of years; but they were not worth in five years as much as those from the stumps cut close to the ground and three to four shoots budded; and those three or four

so far apart that when the freeze came last February the trunks did not touch each other. They were most prolific and bore good fruit.

On that experience I have been building this season. I have been budding the main shoots which started from the roots of the tree; and I expect to bud all my seedlings, from eight to 20 shoots to a tree and let them grow up from the ground. I consider my trunk already grown. Some I grafted last August have oranges set now, and those budded in March have oranges set, and the growth beyond where the fruit is set is from 6 to 8 inches. I do not propose to take any off, not that I consider the fruit of any value but as the rind of an orange is only two leaves sutured—it will not retard the flow of sap to any extent from the wood growth. I will not let the fruit mature, but grow long enough to see what it will do. A large majority that were grafted in pieces of roots have set fruit this season; when grafted they had only six to eight inches of root. The agricultural press is admitting a great many articles on the necessity of bearing wood only for budding. If the quality is true that has been kept in the trees for hundreds of years from the imported fruit; the bud cut from a bud only two weeks old will fruit as early as one cut from the parent tree. It is well known that I have been at work by cross fertilization trying to grow new varieties, not only of oranges, but many other things. I have buds inserted last August, the wood being taken from plants from the seed germinated last May, which are holding fruit this year. If it has been the habit for generations to bear fruit, it will bear just as quickly as by scions from bearing trees. Buds that I set in March, Mandarin on sour stock, are the majority of them, holding an orange or two or three. If it is the nature and habit of the tree to fruit it will fruit when it gets proper food. I consider sprouts coming this year from trees that did not sprout last year are now fit for budding, and anything budded this fall will be worth as much five years from now as those budded in May. I think we as a rule, rely too much on the mature wood in selecting buds. The majority of my budding has been from wood not over three weeks old. Of 5,000 buds I have put in this spring, there is not a thousand that had any wood, it was simply pulp and not one per cent of hard wood. I lost of those 5,000 buds I set not one per cent. I put in eye buds entirely, and used even the terminal bud so soft it would drop over. In my work for years I have used the plant when it has only three or four leaves. I cut that plant off and split it in two and make two buds of one. I have probably not lost one bud in 2,000, but I have used wax cloth entirely for wrapping to exclude the air.

In my early budding 30 or 40 years ago in the North I pushed the bud downward, later I push it upward, but I don't think this makes any difference. Sometimes I have made an experiment of turning the bud upside down. I have had large trees where the buds set in that way. Before the bud gets out an inch it turns upward. A professor asked before the American Pomological Society why roots of seed sprouting inside of the fruit, still hanging on the tree, why the roots are always at one end, and the top or leaves of the plant at the other end; the roots go down and around and the top goes upward just the same as if there was light and atmosphere inside. We know very little about this, we are trying to learn something.

I have generally been shy about reporting an experiment in new varieties, and I find I know very little about a new variety until it has been tried for a few years. Trees

have got as much personality as the individuals here today have; they are just as unlike as we are. The food has something to do with it, accident has more to do with it. I don't believe in anything much unless it is on record. There are standing today in Orange county 50,000 stumps on which I once had budded different varieties and kept a record; I can go, and tell where such a thing stood, and I know where it came from. Today, I can bring back 180 or 190 varieties of citrus. It has taken work. But I think I have now saved the best; I have so far as I am personally concerned. I expect to show better fruit than I have ever seen in Florida. From two buds set in August, I have 500 growing. I expect by this process to have a uniform fruit, nearly all alike, so when I ship one basket, and you see that, you will see the whole. I know exactly what the buds are. As to pruning, it is five years too soon to prune sprouts.

Geo. H. Wright: You speak of cross fertilization and receiving new varieties, do I understand by that that you can use new varieties before the seed was planted?

Mr. Phelps: In some instances; for my records show me—the sprouts which are coming today show me—there is a connection between the scion, or part budded in, and the root. I have seen such cases which came from the terminal bud of a scion, and not from the seed of the cross fertilized fruit.

In nearly all cases I have fruited seedlings from cross-fertilized fruit, in three years. These plants, before the freeze,I had worked on water sprouts in old seedling trees, and from sprouts on the lateral roots of the same trees. They were carrying from 75 to 100 oranges. I expect to show better results from the present sprouts.

In Orange county there are many groves to which little has been done since the freeze; owners waiting for something to turn up. I fear they will wait in vain. I do not believe they will get "something for nothing." Alongside of these waiting groves, when work has been done you may find shoots two inches in diameter ten feet high. The sprouts on the trunks above the ground, I would not trust to make the new tree. Sooner or later they will fail. We must depend on the shoots which come from the healthy wood below where Jack Frost put in his work, so astonishing us all, in a few hours only.

Mr. Montgomery: Where a tree is killed below the ground and sprouts come from the roots should the dirt be removed?

Mr. Phelps: Uncover down to where you strike live bark, it will have a new root at times larger than my finger.

Question. In regard to the lateral roots where their connection with the tap root has been destroyed will such laterals ever make a tap root?

Mr. Phelps: Yes. Nineteen years ago I split a number of forked trees with a saw. The split was two feet long; I covered it with coal tar and set them out. The half of the tree cut off had no tap root. After the freeze when I examined the trees set with no tap root they had two or three tap roots. There was no decayed wood where I had used the coal tar, only a black streak not thicker than blotting paper. While there had formed over this wound three to five inches of sound wood. Also in one instance, when the tree had been injured by fire; I cut out all the unsound wood and put on coal tar. This entirely grew over and there was only the black streak and no decayed wood, when examined after the freeze.

I would not grow a seedling grove. I

don't think there is enough money in it. That has been my experience for a period of years, that one acre of budded oranges brought more net money than two acres of seedlings. I think I shipped as good seedling fruit as was shipped from the State. It was grown from seed of blood oranges. I don't think there is money enough from an experience of 20 years, to pay for growing seedling oranges. For me, budded oranges have netted twice as much as seedlings.

I believe one of the reasons this State has succeeded so well, is because many of the horticulturists of this State came here because they were not willing to die in some other climate; they were willing to give up home for the sake of living and doing some thing some where else. It is the State, it is because of the men, who could not live on the Atlantic coast, or elsewhere; many are here today, and doing something for our country, because we are not willing to give up. The horticulturists are largely made up of men, who are not willing to yield. We are building up the citrus industry because we are not willing to give up the ghost; and we are going to succeed.

I want to correct one or two statements made last night. One of the most admirable addresses we have ever had in this Society was the speech of welcome. It is a very easy problem in finance to show that fifty million dollars were lost by the freeze. We have always admitted we had six millions of boxes of oranges. One dollar a box would be a low estimate. I never shipped a box that netted me less than $1.50 on the tree. Six million dollars is the interest on one hundred million at six per cent. So it is not over stated; and we can not expect to replace one hundred million in a day or a week, and we must fall back and build up the State from the ground. We are going to build up the State by work not tinsel talk, we are going to build it up faster than the most sanguine think, if we do honest work; we are going to have better fruit because we know more about it than we did a dozen years ago.

C. A. Bacon: I am not a sick Yankee. I didn't come here for my health. In this connection I would say, in a year our doctor bill in Florida has been fifty cents for three of us; we have paid doctor's bills to the amount of fifty cents in twenty years. There are one or two points I would like to make. I think our President gave us a beautiful text last night in his sample of bugs, etc. I have always told it, but in a different way. I have always said in our experiments we are apt to leave out something. I once heard a clergyman give an illustration of how a man would succeed if he had his own way and the Lord was left out. An old farmer declared he could raise his crop without the Lord, so the Lord allowed him to raise his wheat. He had the rain and the sunshine, it kept up through the season and his wheat grew beautifully and until it began to head out, when all at once the straws began to crinkle, and in a few days it was lying on the ground. He called a council of his neighbors, they investigated the question and tried to find out where the trouble was; they tried to find out what he had left out; there was no doubt he had left out something the Lord would have put in. After a long investigation they found he had left out what we came here for, that was wind. The rain and the fertilizer and the sunshine he had, but he needed the wind. We came here to get wind to strengthen us, buoy us up and give us strength and encouragement to go on with this thing. But in making our statements we have all left out something. I

want to ask Mr. Phelps one or two questions. What varieties are we going to bud? Take Kumquats, when they first began to bear in Florida, they attracted a great deal of attention. After seeing them in bearing for the first time, I went straight home and set out 100 Kumquats. I did not suppose them fit to eat. I knew they were attracting attention. The Floridian told the Northerners, and they had the money and we wanted it. I had one tree that grew rapidly; when the freeze came it was about eight feet high and had a spread of 10 feet; it was on sweet stock. For three years previous to that I had furnished St. Augustine and Jacksonville with the Kumquats and had sold them at two cents apiece f.o.b. I had one hundred trees that had 80,000 Kumquats, which at two cents apiece would be $1,600. Now my friends, don't all go home and plant Kumquats. You are too late. The early bird has flown away with the worm. Now I hear everybody is budding the grape fruit. My advice would be not to bud too many grape fruit. It is a fancy fruit, Northern people buy it because it is high priced and scarce. They pay five cents apiece in St. Augustine and Jacksonville. That would be more than my Kumquats, although some of these little oranges we mailed North at 10 cents apiece. Grape fruit are a fancy fruit. I like them myself, but poor people don't buy them on account of the price. The price recommends them to the rich and they must have them, and it is fashionable to eat them with a spoon; and they will demand them until the price gets low. But now you are putting out so many that rich people won't have them at all. So with the King orange. Just before the freeze they sold finely. My King oranges sold for $2.50 a double box before the freeze. Two or three years before that I sold boxes for $12.50, but they finally got down as low as $2.00 a box. I don't want fancy varieties and I don't want too many varieties. I want to have one or two straight varieties so I can keep my shipments going forward in 50 or 100 box lots all one brand.

Now in regard to shoots and their treatment. I have budded everyone, separated them and trimmed them, leaving from two to three inches between every sprout, and making the neck of the tree right on the ground. Let them stand there and prop themselves and make a big tree right on the ground where a five foot ladder would pick every orange.

When these sprouts got two or three feet high, large enough to be separated, I went over them and trimmed out the smallest, leaving the rest, say about two inches apart clear around the stump. I broke off every leaf within six inches of the ground, and now when I go to bud everything is ready for business, and I can bud clear around. They are standing up straight and pretty.

James A. Harris: All over our section trees with a single trunk stood the freeze of December 1894, much better than trees having several trunks. A tree with one trunk has much thicker bark than a tree with a divided stem. The result of my observation leads me to believe that a tree with one trunk, one solid trunk, will stand a harder freeze without injury than a tree of the same size with two trunks, because upon the two trunks the bark will be much thinner than upon the one trunk. I have reached the conclusion that it is certainly better to have but one trunk up to a height of two or three feet. The February freeze came along and wiped out everything, but the difference in the effect of the December

freeze upon the single and divided stem was very marked. I have been budding all the way from one to half a dozen sprouts to the tree. I think in the central part of the State it would be best to let only one trunk grow. About the sprouts on the lateral roots: when the old trunk dies out altogether, and is gone, the latter will be in exposed places; and may be blown over. Where the sprouts come up from the laterals they will have no tap root and in course of time will be blown over.

D. O. Davies: The main question about these sprouts is, shall we cut them off generally or leave them all stand? Reduce them to a few, or leave them all stand? In my study of botany, I have obtained from a certain author a full and satisfactory explanation why I should allow them all to stand. He does not say a word about orange trees, but the principle is the same. You remember we had in our groves immense tops and innumerable leaves on the trees. The theory is, every leaf has its infinitesimal filament going down the trunk of the tree. If you have no leaves you have no nourishment for the tree, while the roots sustain the leaves the leaves nourish the roots. You have roots corresponding to the immense tops which have been removed, and these sprouts are nature's method of replacing the breathing surface. Every shoot you cut off kills its root and you diminish the root power. You must let them grow even if you don't intend to bud them.

The second point is one which gives me great concern, as I am depending on my grove, when old age comes—I am looking forward to the time when I will be an old man and resting from my labors—I want to have a sufficiency from my grove to support me; and it is the question of trueness of type. The startling statement was made one year ago, when I did not have the pleasure of being with you, that the Pineapple orange was limited to Orange Lake. I wanted to plant 600 Pineapple trees if I could get them. But here is a statement that you can not have a Pineapple orange away from Orange Lake, and that the peculiar conditions of producing this fruit is limited to that locality. Then Mr. Phelps said a moment since—we were speaking about a fine fruit, and I had said I must have some of that fine fruit—but he said, bless you, a distance of ten miles might radically change everything, texture, character, etc. I sat back, my arms dropped down, and said, what is this? I want to call attention to these statements; they are shocking.

President Adams: They are true.

Mr. Davies: If true, they are the more shocking. What are we going to do? Is there enough in it—I am about 35 miles from you—is there enough in it to deter me—I am 60 miles from Orange Lake—to plant my 600 Pineapple trees? Is there enough in it to prevent me getting first from you that non pareil, that you say you are going to have? I am speaking seriously.

Mr. Phelps: I have been to Spain and Cuba, and I have got fruit that at times cost me as high as $25 a tree. I am not sorry that I did that.

Mr. Davies: I have built castles in Spain but I have never been there—they have been tumbling about my head. But the question is can we plant trees with any confidence that they will come true to type?

Mr. Phelps: You can.

Mr. Montgomery: Plant from the seed.

Mr. Davies: The statement made a year ago, was that you could not find the Pineapple orange away from Orange Lake and

the statement was made by a gentleman who had no local interest in Orange Lake productiveness.

A member: The Pineapple orange did not originate on Orange Lake; it originated on Parson Owen's place about seven miles from Orange Lake.

A member: That is near enough.

Mr. Montgomery: Micanopy is only three miles from Orange Lake.

Mr. Davies: Don't cut sprouts; not one; let them grow. I expect to plant two or three groves out of my young grove. I am going to let 20 or 30 trees grow up where one grew before.

A member: Are not the trees you get from the lateral root shortlived? Are they not slow in coming into bearing?

Mr. Montgomery: I have not waited for them to grow before planting them. I have already planted out 2,500 roots that I have taken up with a stump puller lifting the whole tree out. I have taken out roots nine to 12 feet long. I have planted them out in spaces where I had trees before. Out of those 2,500 over 50 per cent are growing nicely. There are a great many of those roots with sprouts eight inches high. We are going to find that these sprouts are going to give us good trees.

A member: In '75 when we came in here we were anxious to have a few bearing trees around the house. The natives had trees planted too close together, and they sold us a few of them. After removing the trees the lateral roots began to grow and made a lot of young trees. I got a few of them and they did not grow.

Mr. Montgomery: I had one just such a tree as that, it came from a lateral root, and I took particular notice of it—a smooth long root with a little sprout on the end of it. We planted that root in the ground and left the sprout out and it grew well and bore well, and the fruit was good. It was as nice a tree as I have had. If the sprout starts from the side of the trunk take it off; let all your sprouts grow from the ground, and just as soon as they get old enough, bud them. The sprout coming out of a lateral root six to eight inches from the stump draws no nourishment from the tap root; but it gets its nourishment from the outward ends of the root from which it grows, and should be removed as the root is taking so much substance from the land, and will hurt your tree to that extent. My experience is a little different from Mr. Phelps'. In '82 we had a house burn, near which two large orange trees were standing; they were burned to the ground. We cut them near the ground and budded a great many sprouts. My idea was to leave them alone and let them all bear. Those sprouts grew like bushes in a bay-head, and grew in a cluster. I left them standing there for 10 years, and from those two trees in ten years I did not get ten boxes of oranges; they did bear a few crates of thick rind oranges, unfit to ship. I took away all but one sprout from one of the stumps, and the year before the freeze we gathered three boxes off the tree. The sprouts from the other one were from the lateral roots covering a space of three feet about the stump, these sprouts never put out branches, which leads me to believe too many sprouts are not best. I had another tree that got killed, I don't remember how. I pass it every day and look at it; that stump is standing there now and it must be 12 inches in diameter at least. Having the experience I had with these others, I kept every sprout off of it, except one that came from the tap root below the laterals. That sprout threw out its lateral roots, grew up

rapidly, and made a well balanced tree; made a first-rate trunk and bore fruit as nicely and perfectly as any tree I ever had in my life. I was better satisfied with one sprout on the trunk than where I left 20. I was anxious to know whether it was better to leave one, two or four. I have had experience in young trees, two to four inches in diameter, and on these I would leave about four sprouts. You will find after a while they will grow up and make one solid trunk. These trees were killed down in '76.

Mr. Bacon: I am going to bud everything around that will do. I am glad Mr. Phelps has told about his method of budding. I feel that my loss of time and expense will be repaid in that one statement. I am going to bud everything.

A member: I have stumps that must be 15 inches in diameter, may be 18. I have gathered as many as 28 boxes off of some trees before the freeze. Most of them sweet seedling stumps. I am going to bud the sweet seedlings. I have so far budded mostly of the Parson Brown variety. I am going to trim off my sprouts to about eight or nine. I am going to let them stand there until next spring, and then if I am still of the opinion further dissection is essential I am going to cut off four or five sprouts. But I don't see any benefit of keeping the roots alive if you are going to take the sprouts off.

Mr. Phelps: I have demonstrated to my own satisfaction it is best to leave the whole system intact. I expect to remove some of the sprouts later on. As to this question I go by my own observation and judgment.

A member: With your past experience what distance apart are you going to plant trees in future?

Mr. Phelps: If I had the trees to reset again I would have about 25 feet by 15. I would say in that connection, 17 years ago, I budded a hedge in which the trees were set four inches apart in the row, and I had no trees occupying the same area that bore as much fruit as that hedge. There was not enough space when the freeze came so you could stick your finger between the trees, they were hedged close together.

Mr. Montgomery: Why not dig down and bud in the tap root? Have you any experience in that?

Mr. Phelps: I would like as far as I can to get the question brought up by Mr. Davies off my mind. I think perhaps we have got as much variety of climate in Florida as in any state in the Union. Of the isothermal lines, which show climatic conditions there are a number that run across the State. What I stated last year in connection with the Pineapple orange was, that wherever they had a trial—that so far as my experience was concerned I found it successful about Orange Lake, near which it originated. I was anxious to get it, I had not been able to grow the same handsome Pineapple, and other men in other sections had not succeeded with it, but had the same experience as myself. It is worth while to make the experiment. If a man has a good thing I would try and see what it would do; I would make the experiment. But I think the varieties in a grove in Manatee county (a grove said to be the best grove in the county, a grove which was fertilized after my suggestion, and varieties used which I believed would succeed there), constitute a case in point. I went there in November last—found less distinctiveness in variety than I have ever found in any type of Mallin's before. Still I knew the variety was true to name. I have never found two imported trees that were identically alike. They have individuality. In some places I would find more acid in the fruit than in other places. I think

there is more individuality in citrus fruits here than elsewhere, certainly more than in California.

The work of cross fertilizing, upon which I have spent years, I shall continue. As to varieties, I shall bud Tephi, a cross between two Malta oranges, a new type, round, but a little concave at the end; I have submitted specimens to competent judges, none of whom graded it less than 98, which was subsequently revised to 98½. And next to Tephi, I shall bud Fortuna. I advise every man to find out what will do well in his locality, go to the successful man there and plant his fruit. I don't wish to say anything about fertilizers, because I am a fertilizer agent. We should maintain our reputation, an honest reputation, so when you see the top of the box you have seen the bottom, and this is going to build up a trade for any man. A gentleman told me he had never shipped over a third of a crop of pears, peaches and grapes, but lets the other two-thirds go back for the sake of keeping up the price of the others. I shall not bud much grape fruit, pomelo is the proper name for them I think.

In regard to the tap root, I have trees growing that were once cuttings; they have tap roots, and they are as long lived as any. If it is the nature of the tree to have tap roots it will have tap roots. The best lemons I had were cuttings about a foot long planted in the ground, put in nearly horizontally. The citrus trees when I came to Florida were very expensive. I have budded the lemon shoot and put one end in the ground, and another year they were large enough to put in the grove. I called the attention of Prof. Swingle to the largest trunks of any of the trees on the place, four inches in circumference, which were budded on a wild Spanish lime, which never sprouted out. The tree was growing and the trunk of the wild lime was over nine inches in diameter, and I suppose one thousand sprouts came up from that stump last summer. This last year I took up pieces of orange roots as big as my finger, cut them off six to 12 inches long, grafted them, and set them, grafts and all under ground; over 90 per cent lived, and those grafts were cut the morning after the freeze, an lay all in the ground until after the 1st of August; those trees will form tap roots. I think they are just as long lived as any other. Since the freeze there has come out from the lateral roots within a foot of the old trunk a genuine lemon tree. I have got them on other plants; and on the lateral roots on the sour orange has come out a lemon stock. There must be some connection of the sap downward that goes into the circulation of the tree. No one has ever endeavored to demonstrate as a mathematical demonstration how that came about, but I believe such things do happen in citrus fruits. I expect to preserve some of these for study; they may not be of any value, but as I am studying the citrus I want to know something about them. I set this spring, a bud of a variegated orange—bud about ten inches from the ground, leaving the full leaf on the bud. When the bud had been in ten days I cut the stock off four or five inches above the bud. When the bud started a sprout started out eight inches below the inserted bud, on opposite side of stock identical in variegation. The two are growing and can be seen by the interested. Many interesting and strange things are results from the cold cutting off for a time the flow of sap. We all await with interest the fruits. Those who have planted the Satsuma, worked on Trifoliata, an orange, the best result of hundreds of thousands of crosses of Citron and

Trifoliata—will see if they look here and there—strange freaks of foliage striking back first to one parent and then the other. Plants have the habit of imitation; they are wonderfully human.

H. F. Douglass: A number of years ago I bought a piece of ground in one corner of which there was about ½ of an acre that was an old wild orange grove, and it had been in the possession of another party, and he had cut it off about three or four feet, just cut the tops off. He deserted it and I bought it. These orange trees were standing there, thick in many places. I wanted to move them out, and in moving a number of those trees, it was a very heavy clay soil, it took three or four men a day to dig up a tree. After digging them up we cut off the roots around, and a year or two afterwards (I had filled up these holes again) I noticed several sprouts coming up where the orange trees had been before. I let them grow, and in two or three different cases going around I budded those sprouts. I did not want them there and a year or two afterwards I started to move them, and to my utter astonishment they were nothing but everlasting long roots. I removed three or four of those old roots 10 feet long, large as my arm. I thought I was going to have my labor for my pains. I took them and put them in the grove in place of trees that died out, and to my utter astonishment in three or four years afterward had formed strong tap roots. At the time of the freeze those three or four trees were as fine trees as there were in that whole grove bearing as high as ten boxes a tree. I examined those trees three or four years after they were planted to see if they had put down tap roots, and to my astonishment they had, and had put out lateral roots all around. It goes to show those old roots will grow, and they were as fine trees as were in that whole grove.

H. E. Anderson: I had experience with roots on my place. When we came here and bought our trees and set them out, the man I bought of had a considerable number of trees that had been taken up, and the roots that had been cut off, were throwing up little shoots. I asked him if he had any objection to my taking half a dozen home. My only object in taking those home was, to plant them as an experiment. I took the roots home and set them out, and they commenced to grow. When they got large enough I put in buds in those root trees and I would like today to have the picture of those trees which was taken the winter before the freeze, with our family and two or three other families under the branches of those trees. They would have shown well, and the trees were loaded with oranges. There is no question at all that roots can be successfully set out in this way.

Frank H Lytle: I think I heard my friend say he would like to hear a history of the Parson Brown orange, and if it is pertinent to the question before the house, I will give the history. In '74 Capt. Carney came to this country and traveled over the State several years. He became very much pleased with an orange found in Sumter county. The tree belonged to Parson Brown. Capt. Carney was so much pleased with it that he made an offer to buy the tree, and the old lady refused to sell it, but Capt. Carney was a man of much ingenuity, hard to defeat, so he heard the old lady intended to engage in raising sheep, and he indirectly called around and at last stayed all night, the next morning the old lady consented to sell him the tree for $80 and invest it in sheep. He gave $80 for it, and it was to remain there as long as he wanted. That is the history of the Parson Brown orange.

IRRIGATION.

A Cheap way of Watering and an Effective Method of Destroying the White Fly.

Discussion Under Topic "Irrigation."

[SEE MINUTES PAGES 1 TO 6, ITEM 64.]

H. B. Stevens: We have irrigation plants on three of our groves. It is a great consolation in a dry time to know they are there. It rains so frequently in Florida, irrigation for orange culture is not very much needed. It is needed the most during the dry time we usually have in April and May. We have found a cheap method of getting water over the groves to help the trees during a drouth, by having a portable irrigation plant. We have a boiler and pump on a tram car, and wells at different intervals through the grove. We couple our pump on to these wells. Instead of using hose, we use two inch iron pipe, coupled together with hose couplings. We find we can handle it very quickly, and get better pressure than through flexible hose, because the friction is not so great, and we use only one or two sections of flexible hose at the end of the pipe. By putting in a Y at the end of the pipe, we can run two streams at a time, and it is a very cheap way of irrigating a grove. It was the most economical way we could find to go over the grove spraying the white fly. We suffered a great deal with the white fly, but haven't any of them now. The flies covered the leaves with their sooty mold to such an extent that the trees could not grow, and the oranges where the smut was on the upper half, which was generally the case, would not ripen.

Out of the crop of a fifteen acre grove 3,000 boxes had to be thrown away, so the damage was quite severe. In another grove where the white fly first originated, but one crop was severely injured, the next crop being very much better. A fungus attacked the pupa of the fly that soon thinned them out. After the freeze last spring, we found the pupa of the fly on the little seedlings that were just coming up, we went over the grove, and destroyed them all. The council of our place passed a resolution, requestnig the citizens to destroy all their cape jessamines and other plants that might be affected by the white fly, they also employed an expert to go around and examine every plant to see that all the pupa was destroyed. The citizens responded very readily, and so we have not a single white fly this year.

Geo. H. Wright: I have heard something of Mr. Stevens' experience about the white fly. I had come to the same conclusion before I had heard his views on the subject. I am satisfied from what I had seen before the freeze, that there really is

not so much danger of the white fly destroying the groves in the future as many anticipate. In regard to irrigation, it is not the groves alone that we irrigate. The amount of rainfall we had through the spring and last fall, and the dry weather we have had this season, show the great value of water for vegetables, the great value of irrigation, and the part it is going to play in the future of Florida.

Mr. Stevens: Keep the white fly away if you can.

RESTORING FROZEN-BACK ORANGE TREES.

Experience with "Bark-Grafting" (or "Sprig-Budding") Below the Surface.

Paper prepared and read by Edward Winter, of DeLand, Volusia Co., member of Standing Committee on Citrus Fruits.

[SEE MINUTES PAGES 1 TO 6, ITEM 13.]

Mr. President and members of the Society: Accompanying this report and for the benefit of those interested in the subject under consideration are three photographs; one of an orange tree in bloom, taken last month; one taken two days ago, showing the growth the trees have made in little over a year's time; the third, a pomelo tree, also taken two days ago, showing the fruit on the tree.

These pictures were taken in one of Mr. Stetson's groves at DeLand and illustrate one way of restoring a frozen orange tree, and which has been referred to as "the Adams' method of grafting," explained to us here a year ago by our President.

A great many ways have been suggested and practiced to restore our orange trees. That of cutting down promptly to sound wood and grafting the stumps, though not generally done, has, when properly done, been very successful, and when successfully done, two or three years' time is saved. The requisites for success, are as follows: Cut down to perfectly sound wood, use dormant scions; insert between bark and wood, so as to make a close union and then in order to preserve the moisture in scion, pack fresh moist earth around the scions, leaving one or two eye buds exposed.

The proper time for this was, of course, right after the catastrophe. But the great trouble (even if the growers had known what to do and desired to graft), was the scarcity of scions. As far as I know those who grafted a year ago sent to California or Arizona for their scions. Where failure occurred it was due to various causes, such as failure to reach sound or perhaps too old, imperfect mechanical execution of the work, advanced season, etc.

At our meeting last year some of our leading members doubted the wisdom of this method of bringing our groves back to bearing. That it was the proper course to pursue, it seems to me, cannot longer be questioned. In one of our groves 95 per cent. of the grafts "took." The success in this grove must be attributed first to the condition in which the trees were during the cold weather, viz., well protected by

earth thrown to them with plow; secondly, the roots are the rough Florida lemon, averaging one and a half inches, a nice size to work.

In the grove where these pictures were taken, the roots are sour and sweet orange, and the stock varying in size, where cut off, from two to three inches, 70 per cent of these grafts are living and have made a growth varying from two to nine feet in height. Some are so full of fruit, particularly the pomelos, that if only one-quarter now on the trees matures, it will necessitate the propping of the trees. We have been advised by many to "thin out" the fruit on these grafts, fearing the effort to mature such a crop (seventy pomelos to one tree), will cause its death. But rather than wilfully remove a single orange or grape fruit we will let the trees give up the ghost, feeling that they will die in a good cause.

So much for last year's grafting.

Encouraged by the appearance of these grafts many in our vicinity went at it this season. Where done early in January and February it gives promise of success, one party reporting 85 per cent. doing well. In this case the dead trees are yet standing and the scions inserted either in the main stock, some below the level of the ground, or on the lateral roots; grafting all sizes of trees in growing as well as in dormant conditions. What the ultimate outcome of this year's grafting will be, can at this time only be conjectured; we will watch and wait.

INSECT ENEMIES OF TENDER CITRUS GROWTH.

Protecting Young Buds and Sprouts From Their Attacks.

Discussion following Mr. Winter's Paper on "Restoring Frozen-Back Orange Trees".

[SEE MINUTES PAGES 1 TO 6, ITEM 14.]

W. S. Hart: I would like to ask Mr. Winter if he has been troubled with grasshoppers and ants eating off his crown grafts this spring? I find it very difficult to get the grafts up to mature wood on account of their being eaten into by the ants and grasshoppers. These insects not only eat off the sprout, but they eat right in and take the bud out so there is no possibility of their starting again. In that way I have lost a good many, and must take some means of protecting the rest.

Edward Winter: I must say that is our greatest trouble now, and I came here to learn a remedy to exterminate these grasshoppers.

Mr. Hart: I think the worst trouble is from the little black ants, they not only eat the bud when it is small, but when it has nearly completed its first growth they eat the bark from around its base so that it dies or will break off. I not only noticed the effect on the buds, but on young fruit also. On one tree I noticed every fruit on the tree had been scarred on the upper side.

Geo. H. Wright: Several years ago I tried an experiment in poisoning noxious

insects. I tried a mixture of Paris green, bran and sorghum molasses, and I found I could get rid of grasshoppers. The Paris green to poison, the bran to hold it in a body, and the molasses to make it palatable. I got rid of the grasshopper, cut worms and everything of that kind, not only on buds, but on vegetables and cabbages. A year ago I tried it on orange buds. I cut off about 35 acres, commencing in February soon after the freeze and began to put in buds as soon as I could get them, and put about 10 acres of buds in old stock. I found the difficulty that others have met with in the destruction of the buds by grasshoppers. This poisoning is the easiest and simplest plan you could adopt.

G. R. Fairbanks: Does this apply to all kinds of buds or only to those in the crown and where the bud is near the sand? I would like to hear if these remarks apply to that particular kind of bud, or any particular kind of soil?

Mr. Hart: Replying to Mr Fairbanks, I would say, that the grasshoppers are much more apt to trouble new wood near the ground than where it is high up, but the little black stinging ants will go anywhere in the tree and give trouble. I remember a grape fruit tree I had that the ants were eating. I tried corrosive sublimate by putting a paper around the tree; and over that I tied a string dipped in lard and corrosive sublimate. That will keep them out, but it is very difficult to put it around the tree so they can't get under the paper. I took a fresh rabbit skin and put it around the tree with its hair side out. That snarled them up for a time but the weather beat it down, and they got over it. I tried chalk, tobacco, tomato juice, lime, etc., but finally lost the tree. On trees where I bent the limbs down to start the bud, and left them down rather than cut them off, I notice the limbs are very much eaten by the grasshoppers, while those higher up are very much less injured; so I don't think the grasshoppers are inclined to work high.

A member: My observation has been that the grasshoppers are worse where there is the least vegetation. If there is nothing but orange sprouts, they take the sprouts. In groves on low land where the drouth has not affected the vegetation they are not so bad as on upland. I never tried any experiment of getting rid of them in the orange grove, but I have in the tomato patch, but I used strychnine instead of Paris green, and they seemed to be fond of the taste. I have also blown out colonies of ants with bisulphide of carbon, by making a few holes in the earth and pouring in the carbon and setting it afire, and in that way I got rid of the ants.

P. H. Rolfs: In regard to the bisulphide of carbon I never set it afire; I find it more effective to let it work its own way. In regard to orange trees if you can find the common nest, for they live in colonies, you will find that the most effective way. We have no trouble with ants in planting buds where we are working. In regard to bisulphide of carbon I want to say one word; it is very explosive, be careful not to put it too close to your tree. Use it with as much caution as you would use kerosene, possibly a little more. We need to be a little more cautious because it is more volatile than kerosene; the flashing point was found to be 149, kerosene is registered at 150; that is the second quality. I think any one will be very much pleased with the action of it on ants or insects that live in colonies, such as white ants, etc.

L. Montgomery: I want to ask the gentleman how much poisoned bran he puts to a tree?

Mr. Wright: A spoonful or more; put it on pieces of bark or wood. The preparation of arsenic I used was one-fourth of a pound to half a bushel of bran, then enough syrup to make a paste. It may be put on strips of board, so that what is left may be gathered up and buried. With reference to the bisulphide of carbon I would caution anybody against getting to the windward side when it exploded, as it might work a bad effect. As to the amount of Paris green used, if you get pure Paris green use less than of the usual commercial Paris green as the latter is more or less adulterated. I don't think as a rule you can use too much of it. The idea is to kill. There is no danger but what they will eat it.

Lyman Phelps: I have used the same preparation, but I always mix the Paris green and bran in the proportion of one to ten with just enough sweet to hold it together, and always drop it on the ground a few feet from the plant. It always kills the cut worms, but the ants will not eat poison. The only trouble I find with the eye bud was its being eaten off by the grasshoppers, and a small insect about one-third of an inch wide; they eat a good deal around close to the ground. I have found a worm in the eye this spring, the first I have seen.

Mr. Hart: Probably the best thing I used—the most successful in destroying ants—is just a little syrup and water in a milk can sunk in a hole in their runways. They go down into that to eat it and cannot get out. I have killed millions in that way, but I have to do it when there is a honey flow on it, or my bees will scent it out and try to get it to carry to their hives. The worst pest of all with me is a very small black stinging ant that does not gather in large nests so it can be killed with carbon bisulphide, and like remedies. Their nests are small and scattered, sometimes up in the tree itself and covered with sand and trash that they carry up.

C. A. Bacon: I think this question about ants is a good deal like the story of the bed bug poison; when asked how to apply it, the inventor said: First catch the bed bug, open his mouth and pour the brick dust in. All these ingredients cost money. I think it is all foolishness. Why not use boiling water? I have never found it to fail. In regard to grasshoppers, they know a sweet bud when they see it; when you are putting those buds in there are 10 or 12 grasshoppers watching you, and they will eat out the eye and kill it. Buds in some sprouts I set close to the ground did not start because of these grasshoppers. About last July or August some of these trees came up nicely and started very vigorously around the stump; the grasshoppers came to those trees. I was satisfied that the stump would die if I allowed the grasshoppers to eat the foliage so I put mosquito netting around the stump, and found it working nicely in most cases, but the stumps grew so thrifty they lifted the net up. If Mr. Wright's remedy for grasshoppers is effectual I think it is a good thing. In reference to ants in my experience boiling water is good, and also for wood lice; I take a kettle of it as fast as I can get it, and pour it around the roots of the stump. It kills out the lice and doesn't injure the bark.

Mr. Montgomery: There are two things that will kill out all ants that live in the buds, one is spirits of turpentine. It wont

injure any root; it will perhaps kill if it goes too much on the root, but still I never have seen any trouble. The best thing is corrosive sublimate; drop a little powdered corrosive sublimate, just a pinch is sufficient, in the places where they come out, and you will so demoralize them, they will dwindle away and die, and they will finally leave entirely, and you can clean them out. You can get it of McKesson & Robbins in New York for 85 cents a pound. You want the powdered corrosive sublimate. A pound of it will exterminate the ants from ten acres of land. If the ants don't live in colonies in the ground, smooth off the earth nicely and make a little string of this corrosive sublimate around the tree; the ants wont cross it. I have had universal success with it; they never came back, that season at least.

Mr. Phelps: They turn up their toes forever.

H. E. Anderson: This grasshopper that you speak of, is it something new?

Mr. Bacon: Old as Pharaoh.

H. G. Hubbard: That is a very important question: What is this grasshopper? I don't believe any entomologist can answer that question at present. The grasshopper that is doing the harm now, that is troubling these buds is entirely different from the fall grasshopper; we never had them before: those that trouble us in the latter part of the summer are troublesome mainly because they live on crab grass and weeds all summer long, and when the grass dies and food becomes scarce in the fall, for want of food they attack the orange trees. But those now eating orange buds are entirely different, and they seem to be more numerous than I have ever seen them before, so I don't think the old remedies given for the ordinary grasshopper will apply to those that trouble the shoots this spring. Some benefit can be derived in plowing in the late fall and disturbing the ground, of course in a country where they have winter that is effective because the eggs are frozen; but here in Florida we can not do that; however, a great many eggs can be destroyed by plowing after the eggs are laid in the winter. The fall grasshoppers have not hatched yet: they will hatch some time before mid summer. Those now at work are mostly small greenish grasshoppers with long slender antennae. In regard to ants the remedy of corrosive sublimate meets my approbation more than anything else I have heard mentioned here. That remedy is known to be very effective in regard to ants. I have used it to protect plants from ants. The ant that does the most mischief is a little brown, stinging ant that lives in a colony. There is another little black ant, which also lives in small colonies and so much scattered, that it would be utterly impracticable to attack them in their homes—I have sometimes used a little napthaline, not that which is sold in the form of balls, but the powder. This will keep them away as long as it lasts, but it evaporates, and it has to be renewed; still, of course, it is important to protect the buds, and a great deal of care and pains must be taken to ensure success.

Mr. Phelps: Mr. Hubbard has started a very interesting subject. They are not the grasshopper of last fall; they have laid their eggs for the first time; I have seen them in the leaves that are alive on the ground; they are there in millions, but the worst is the larva of the lubber, which hatches out in colonies. No turkey will eat them, he will turn it down and look around and walk off. I have thrown them

in the lake and they will not sink, and trout will come up and take one under and in a few seconds it will be on top of the water. Those are the ones doing the most damage. In places which have been neglected I have seen millions. There is another one about 1¼ to 1½ inches long and it has no wings. I never see them outside of the orange grove. The only way is to catch them. I have used corrosive sublimate for years, bought it in 10 pound lots, and I have kept away ants. It is a very serious matter what we are going to do with these grasshoppers after the drouth we have had this spring. They have been more prolific this spring then I have ever known them before. I don't keep up with the names; there are five or six varieties of grasshoppers very plentiful with me, and I see them on every side. I have seen them at Lake Helen on a grove which is more of a grove than I have seen in Orange county, where they will set 1,000 boxes of fruit, the grasshoppers are all over those trees.

H. F. Douglass: There is a little insect on the spears of grass in the morning with a little stripe on it.

Mr. Phelps: That is the larva of the large lubber; he grows to be an inch and a half long, and one day he will split along the back and cast off his old shell, and in two hours time he will be about four times the size. He will have wings of the most delicate pink I ever looked at. I have never seen them so thick as this spring; they are all over the hammocks.

Mr. Douglass: What name do you give them?

Mr. Phelps: The lubber. I sent to the editor of the American Agriculturist two specimens put up in glass, one of the lubber grown and one of the chrysalis, and strange to say he made an error in giving two names in the American Agriculturist, but in the next number he corrected it.

Mr. Hubbard: The lubber grasshoppers while young are accustomed to keep together. When they get large they scatter. In the region of Putnam county they have been very common for the last two months and a half. The adult lubbers often eat orange leaves, but the young feed on lilies and will not leave the lilies as long as there are any leaves left. They have not been reported troublesome in the orange groves in that part of the State. I have had every spring to pay particular attention to the young lubber grasshoppers, to save my lily plants from ruin. When they come out of the ground they keep together, and you will find them for weeks every evening gathered together, and then they are easily killed. You can destroy a whole group at one time; it is better to take a paddle and mash them. You can with one clap destroy a whole brood. It is not a difficult matter to keep a large orange grove free from the lubber grasshopper if taken in time, but it would be a herculean task to undertake it when they separate. I don't think they are now doing much damage to orange shoots. While the large lubber grasshoppers occasionally eat the leaves, they never remain long out in the sun after they pass the chrysalis stage, they will seek some low piece of ground and spend the summer in swampy places seeking the shade. When the orange trees are large occasionally a full grown lubber grasshopper will be found in there eating a few leaves. Later on in the fall when the weather gets clear they will come up on the dry lands to lay their eggs in the dry sand.

Mr. Phelps: I set out buds in standard trees, beginning early in March, and before I got through budding the trees (which took from five to eight buds to a tree), this grasshopper came along, and I had them in all stages. The only thing I could do was to kill them, and I took a pair of gloves and put them on my hands and mashed them. They would be crawling up the trunks of the trees, but they crowded on and when budding stopped in July they were still eating the buds, but the only success I had was by fighting and keeping it up. My place is next to a lake where I have lilies, and they seemed to come up from those lilies and spread from those. I poured boiling water on them and know I have killed legions of them.

Prof. Rolfs: We had a peculiar condition of circumstances, which have caused the insects to be so numerous as they are. The winter before last we had it cold, which kept the insects dormant all winter; when spring came on we had an abundance of them, 17 or 18 different species of insects, many of them grasshoppers, which are much more abundant than I have ever seen them in Florida before. This mild winter we have had no hibernation of insects and we have this enormous crop of grasshoppers early in the year. When the rainy season comes on we will have myriads of these destroyed. I don't think we need be alarmed about the later crop. It was so last year, the later crop was not so much destroyed. These grasshoppers are not a destructive insect at the different points I visited last year, and the few rains we have had so far have caused them to multiply unusually late and not destroyed any of them, and the drouth has forced them to eat the orange buds or leaves where otherwise they would prefer other vegetation.

ORANGE AND LEMON GROWING.

How to Manage for Quick Returns, and Best Results in the Long Run, With Least Frost Risk.

Paper prepared and read by H. B. Stevens, of Citra, Marion county, Chairman of the Standing Committee on Citrus Fruits.

[SEE MINUTES PAGES 1 TO 6, ITEM 11.]

Mr. President, Ladies and Gentlemen: The question of citrus fruits, as the groves now are, is a question of how to get bearing trees the quickest, as fruit is a thing of the past, at least for the present, except in limited quantities. This can be done first, by budding with the variety of orange that is known to bear the quickest; second, by budding with thornless buds, and as best results in the long run are to be desired as well as quick returns, this thornless bud is very desirable, as it gives an open and comparatively thornless top, so that there is less pruning to be done, and less fruit injured by thorns.

As a lesson learned from the past, it is well to bud as near the ground as possible, so that the point of union can easily be protected from injury by cold. Also clip back the ends of the shoots, and cause them to branch out and become stocky trees, and save in the length of ladders and

cost of picking. Then it would be well, also, for each grower to set apart a portion of his grove, which he would bud with the very best varieties he could get, such as brought the best prices in the market. This particular part of his grove to be protected by a shed, as some pineapple men do their plants, and in this way not only save your trees, but have fruit you can hold as late as it will stay on the trees. In the northern part of the orange belt the roof would have to be double slatted and supplemented with rosin fires in severe weather. Having trimmed your trees low, as I have suggested, the shed would not need to be as high as would be required to protect such trees as we had before the freeze. If properly cared for these sheds would last many years, and one full crop on the ground enclosed would pay for them .

We pay out a great deal of money to insure our buildings against fire, why not pay out what would be but a small sum per year to insure our business against loss by cold. We would rest better cold nights, if we knew we had a portion of our grove out of harm's way, and it would be a pleasure to be shipping nice, fresh, fancy Florida oranges late in the season when the market was bare and prices high.

The lemon can be grown in any part of the orange belt of Florida in this way with safety, and a better quality of lemons would bc raised in this way than ever before, as the trees would not be injured by the cold. The fruit from a single crop of one hundred lemon trees in this section has been known to net , over freight and commission, $960.00. Would it not pay to expend some money to secure such trees against frost, when you could count on about this much every year, if the trees were kept healthy and the blossoms free from frost?

If you begin to figure the cost of a shed for one acre it will probably startle you, but you must divide that by the number of years it will stand, and you will see that it is not so heavy after all. And is it not best to adopt the old sailor's adage: "Better to be sure than sorry."

PEACHES AND PLUMS ON THE WEST FLORIDA HIGHLANDS.

Paper prepared by G. W. Mellish, of DeFuniak Springs, Walton county, member of the Standing Committee on Peaches and Plums, and read by the Secretary Also remarks by A. W. Stewart, of Galt, Santa Rosa county

[SEE MINUTES PAGES 1 TO 6, ITEMS 23 AND 63.]

Mr. President and Fellow Members:

My experience in peach and plum culture is limited to the highlands of West Florida, and the discussion of the subject in this paper is chiefly applicable to that region. This section has been sparsely settled for more than a hundred years, and peaches and plums have been grown as long as the oldest inhabitant can remember. Seedling peach trees twenty-five and thirty years old are not uncommon.

Commercial orchards were started about ten years ago and fruit growing has now become the leading industry. The proper location of an orchard is of first importance, and my observation leads to the conclusion, that the higher elevations are to be preferred. They afford better natural drainage and greater immunity from late frosts. The best soil for these fruits is a sandy loam, with a sub-soil of three or four feet that is sufficiently loose and porous to afford thorough drainage and room for the development of a large root growth. The roots of the peach tree do not penetrate the hard clay sub-soil as readily as do those of pears or apples, and if I am not mistaken the roots of a tree require more room than the top.

Thorough drainage is absolutely necessary to success, and if this is not afforded by the natural lay of the land, artificial means must be employed to give an easy outlet to the excess of water that invariably comes with the rainy season. In our locality orchards have been planted on land in all stages of preparation, and some with no preparation at all, and all kinds of results have followed. The irrepressible land agent will tell the fresh Yankee, who is determined to get rich at once, that he can clear the land of pine trees, dig holes in the wire grass sod, plant his trees and prepare his land at his leisure. But the more experienced peach grower will prepare his land a year in advance by seeding it to beggar weed, turning this under in the winter, and plant his trees in soil so well pulverized that the roots can grow with the greatest freedom.

The root-pruned method of planting peach trees was tried in an orchard of three thousand trees at our place this spring. The three to four feet grade of trees were used, and the tops were cut back and roots pruned by the nurseryman. The saving in freight paid for the pruning. The land was a virgin black-jack sand ridge. A strip of ground about five feet wide for a tree row, was thoroughly pulverized with a plow and harrow. A place for the tree was made with a single thrust of the spade, the tap root stuck into its place and the sand packed hard against the roots. Packing the earth firmly about the roots is the most essential point in tree planting, and it can be done more satisfactorily with a few stub roots than with a

mass of fibrous roots. The trees were planted in March, passed through a very dry April, and on May 1st., showed no greater loss than is usually sustained by the old method.

The varieties of peaches planted on the highlands of West Florida are much the same as those in central and southern Georgia. Each variety ripens about ten days earlier in Florida than in central Georgia. In the list of market peaches the magnificent Elberta is the standard of excellence. In DeFuniak Springs this peach ripens from the 25th of June to the 10th of July. If properly handled it will reach any market in the United States in good condition. The tree is a vigorous grower and very prolific. It constitutes about two-thirds of the trees planted. Other old varieties worthy of mention are Foster, Early and Late Crawford, Amelia and Mountain Rose. The Alexander type of peaches has not given much satisfaction. A new extra early peach that promises well is the Sneed. It is a handsome cream colored peach, with brilliant red cheek, and ripens about ten days before Alexander. It is a cling-stone of very good quality. The tree puts out unusually heavy foliage, and is a vigorous grower. It belongs to the Chinese cling type, and may prove a shy bearer. Another new peach, not fruited with us yet, is the Triumph; a yellow fleshed peach, ripening with the Alexander. If this proves satisfactory it will be very popular. A new late peach is the Estella; originated in DeFuniak Springs, ripens about September 1st. It is a large yellow fleshed free-stone, of excellent quality.

The question of properly fertilizing a peach orchard is a complicated one, and requires various answers to varying conditions. My belief is that fertilizers slow and constant in their action are to be preferred. If the soil is not full of vegetable matter, it should be put in that condition as soon as possible. The gradual and constant decay of vegetation is the natural food of the tree and furnishes nitrogen in the best form. My plan would be to allow a growth of beggar weed in the fall months; this to be worked into the soil with a cutaway harrow rather than with a plow. Supplement this with regular and constant applications of bone meal and potash, and I think the results will be satisfactory. My observation has been, that heavy applications of very soluble fertilizers produced an unnatural circulation of sap, and this caused what is known as "gum disease," "dropsy," or "foot-rot."

Does peach culture pay? Success in this depends on much the same conditions as in other lines of work. There is always a demand for the best. A single layer crate, containing 36 selected Elberta peaches sold for $3.00 in New York City last season, when the market was glutted with fruit. On the same day, in the same city, a crate containing about 100 common peaches of the same variety, netted the grower a two cent postage stamp. And it is ever thus. In no line of work will skill and business tact be more liberally rewarded than in peach culture. Size of fruit, flavor, color, texture, neatness of package, and honest dealing on the part of both producer and dealer, all enter into the elements of success, and must be worked out by experience.

PLUMS.

The only plums that have been planted in large quantities are the Oriental varieties. The result of eight years experience with these fruits is not as encouraging as

had been expected. However, experiments with them will not be discontinued and better results are expected from the new hybrids that are being produced in our own latitude. The Botan and Burbank are varieties of real value. The Kelsey has been practically abandoned as too tender in the bud, and the Satsuma Blood is not very reliable. No variety so far tested can resist the attack of the curculio. Nearly all varieties of Oriental plums are good shippers, very large and handsome, and it is confidently expected that they will form the basis for the development of a race of plums that will afford a good profit for the producer, and great pleasure for the consumer.

DISCUSSION.

(The following remarks did not follow the reading of Mr. Mellish's paper, but were made at a previous session, under topic "Peaches and Plums;" they are inserted here as they properly come under the above head).

[SEE MINUTES PAGES 1 TO 6, ITEM 23.]

A. W. Stewart: We have tried the different varieties of plums in our section of West Florida (Santa Rosa county). I have tried 20 varieties. We have made a success of the Satsuma, and some other Japan varieties. Plums there seem to hold well and ripen up, that is, where the trees are taken care of. We have trees three years old that measure 11 inches around the base and 14 feet across the top and are loaded with fruit, but like everything else they have to be cultivated. Lack of better culture has been the cause of much of the failure in plums, as well as peaches; people set them out and let them grow. They must be cultivated and they must be pruned. I pruned every tree I set out, pruned the top back. A great many have made a failure by just digging a hole as wide as the spade and cramming the roots down, and wonder—they surely planted that tree out—why that tree has not gone on and borne fruit, and the nurseryman is blamed because that tree has not succeeded. Most of the varieties we plant are of the Persian strain. Peaches require thorough cultivation just as orange trees do; and those here who have cultivated oranges know what attention it takes. The Persian varieties with us do not put out until after our cold weather is over. The last heavy freeze we had in '95 did not affect our peaches or plums. We had, I think, perhaps the largest growth we ever had in West Florida last year. The trees did not put out until after the heavy freeze.

The borer, we have had some trouble with. I have experimented some with that by using potash. I tried it on 150 trees; I dug around the trees and put three shovelfuls around each tree the last of August, and I examined those trees carefully in the spring and I did not find one single borer in the 150 trees, so I am satisfied it is effective. Good potash doesn't hurt the tree. By using potash liberally it ripens up the fruit. We have a good market for our fruit and we can not complain—so far as our plums and peaches are concerned. And if our people will continue, I think that West Florida will make a grand success of the peach and plum. The growers should be particular in setting out the trees, digging the holes larger and taking pains to trim the roots, and spreading out the roots that remain, pruning the trees and giving them proper care; those who have done this have made a success.

PEACHES IN THE LAKE REGION.

The Outlook in General—Methods and Results—Requisites for Successful Culture.

Paper prepared by E. D. Putney, of Mt. Dora, Lake county, and read by the Secretary.

[SEE MINUTES PAGES 1 TO 6, ITEM 22.]

Following the freeze of 1886, several hundred acres of peach trees were planted in the immediate vicinity of Mt. Dora. The Peen-to was the principal variety. Some of the older settlers report that they received poor care; others report that the growers intended to take good care of them both in fertilizing and cultivation. At any rate, at the present writing we find but one party doing anything commercially. He was a practical peach and grape grower in central New York, and up to the time of the freeze of '95, claimed to have made considerable money in his peaches here. His oldest orchard is of the Peen-to variety. Younger orchards are of Bidwell's Early and Waldo. The older trees of Bidwell's Early were killed outright by the freeze. The younger trees survived and bore a fair crop of fruit this year. The Waldo's that were fertilized in 1894 bore a fair crop of fruit this season. On the others that were not fertilized, very few matured. He ships his selected peaches to Northern cities. His seconds he ships to Jacksonville, Tampa and other near by cities. He uses the six basket carrier crates. His land is a good grade of high pine land. During the first year's growth he uses nitrate of soda. I am not informed as to fertilizers he uses to make the fruit.

My own efforts began in February 1895. I planted two to three feet trees, well cut back with only the damaged roots pruned. Soon after planting I piled earth around the tree so as to nearly cover it. It was well I did so, for it saved the trees from destruction by the freeze of February 1895. The tips were then making growth but were not uncovered. Some trees received so severe a check that they never entirely recovered, but the majority made a good growth.

Soon after planting each tree received one pound of fish, bone and potash, hoed in around the tree. In July, furrows were opened about 40 inches from the tree and another pound was given them. The cultivator was run every three weeks up to October 1st. No attempt was made to summer prune or check any branches that came out above the bud. The best trees, at the close of the growing season, were from six to eight feet six inches high. They were pruned when about one-eighth of the bloom was out, shortening the smaller branches about one quarter. In most cases from ten to twenty-five peaches were left on the tree. One tree that was not pruned or thinned carried 284 peaches up to April 10th. I send herewith a photograph of this tree taken May 2nd. I also send two other photographs of one of my best trees, as it was before pruning, and again a few minutes later as it was after pruning. These photos were taken twelve and fifteen months after planting. The varieties are Bidwell's Early and Waldo. All

grown on a very good grade of high pine land.

This spring I planted 600 more trees of 2-3 feet size and cut back tops and roots as shown in photo No. 1. The roots were cut quite close to tap root, and all were planted in opening made by spade thrust into the ground and worked back and forth once. As the spade was removed, the root was inserted and one heavy pressure with the foot completed the planting. They were not watered, and up to the middle of the extended drouth all were growing but four which were not put in deep enough. I believe in root pruning for very small peach trees, but I should not attempt it on six to eight feet trees.

I have leased a three year old peach orchard of the Bidwell's Early variety, that was neglected during 1895. It was almost destroyed by the frost. In January 1896 I plowed under a mat of crab grass and sand spurs, and when blossoms were showing I began cultivation. When the peaches were the size of acorns, I gave each tree three pounds of fish, bone and potash and Canada hardwood ashes. Although the dry weather was very severe, by means of constant cultivation they made a fair crop which netted me $1.48 per bushel.

From what knowledge I now have at command I would not hesitate to plant as many peaches of the Bidwell's Early as I could give good care. They come at a time when there is a dearth of fresh fruit in Northern markets. A few days later California sends train loads of fine cherries which affect the market in some degree for Waldo's, Angel's and other later varieties.

PEACH GROWING IN SOUTH FLORIDA.

Best Varieties—Probabilities of the Industry—Trees Planted in Orange Grove.

Remarks by Mr. J. P Mace, of Lake Helen, Volusia county.

[SEE MINUTES PAGES 1 TO 6, ITEM 23.]

(The discussion given below followed the reading of Mr. Putney's paper on "Peaches in the Lake Region").

W. S. Hart: I would like to hear from Mr. Mace, in regard to peaches.

J. P. Mace: I came in a little late and did not hear the beginning of the discussion. I don't know that I have anything that would be new. The freeze last year killed our peach trees. We cut them off above the bud and they have made nice tops. My experience has been largely with a variety of local reputation called "Suber." We have a very nice crop this year. I shipped my first crate Tuesday morning (May 5th). As to fertilizing, I have practiced using high grade orange tree fertilizer, and apply sulphate of potash a month before the crop comes in, and after the crop is off, I give the trees a liberal dressing of tobacco stems.

(The Secretary takes the liberty of adding here the following notes received from Mr. Mace, under date of June 19th, 1896).

The "Suber" peach, is a seedling of the Peen-to, originated by a colored man here at Lake Helen. Out of about 1,300 peach

trees I have now, something less than 200 are Suber. I should have planted a larger percentage of this variety if I could have obtained the trees. It is very similar to Bidwell's Early, Maggie and Yum Yum, all of which I have growing side by side. For a year or two I did think the Suber was a finer and larger peach than the others, but, I have concluded that the difference is due to difference in the soil; the Suber trees being on lower land are not affected so badly by our usual May drouths. It does not load itself so heavily with fruit as Bidwell's Early, and for this reason is apt to have larger fruit. I don't think Suber is quite as highly colored as Bidwell's Early. It is perhaps a little more acid and a little firmer than the others mentioned, but, after all, there is no material difference.

My peach trees are all set in orange groves, in the centers of squares of orange trees which are 25 feet apart, and they will not interfere with the orange trees for five or six years. I intended digging out the oldest peach trees last year, but the freeze took the orange trees out of the way, and killed the peaches back to the large limbs or bodies; but they made a new top last year and had a very nice crop this year. I think three to three and one-half carriers of merchantable fruit to the tree would be a fair estimate of the crop. Taking one season with another the entire crop through, $1.00 per carrier is all we can count upon, and that only by the closest personal attention to every detail of the whole business. If anyone expects to sit in an easy chair on his veranda, and hire some one to look after the business, he had better let it alone.

I will finish shipping Bidwell's Early, Suber, Maggie and Yum Yum tomorrow (June 20th). I am just starting upon Bidwell's Late and Angel.

PLUM CURCULIO IN PENINSULAR FLORIDA.

Discussion under topic "Peaches and Plums."

[SEE MINUTES PAGES 1 TO 6, ITEM 23.]

H. F. Douglass: I would like to ask in regard to plums. For years I have had several varieties; I don't know the exact varieties, but in almost every variety they would bloom and be as white as a sheet, and everything fall off, not one bloom in ten thousand would set.

A. W. Stewart: I should use plenty of potash.

Mr. Douglass: One of my neighbors had quite a number and quite a variety, and he said he would cut them down; fine trees, probably 15 feet high, trees from five to six inches in diameter; and he said he had got about disgusted with them and he was going to cut them down. He said he had heard somebody say something about using Paris green or London purple, and he spread some on, and to his astonishment they have held. I would like to know if anybody has had experience of the kind.

A member: We can raise plums, but we want to raise them in the chicken yards, shake a tree occasionally and the chickens eat up the curculio. Mr. Anderson has been successful in raising quite a

variety of plums, the Kelsey and others, and this spring he has planted several thousand plums and several acres of peach trees, but his Kelsey plums he was successful in raising wherever he had chickens.

A member: I think the chickens eat the curculio. I have had the same experience as my friends, and we find no trouble, because they scratch around, and as quickly as it appears, they eat it.

L. Montgomery: I believe spraying will do the whole thing. As to potash, we have a neighbor that does quite a good deal of washing, and she has plum trees around her place. The water from her washing is thrown around the trees, and they do well.

President Adams: This lady makes her own soap? The hard soap commonly used contains soda not potash.

Mr. Montgomery: Yes, she uses a good deal of lye.

H. G. Hubbard: The plum curculio does not exist in the peninsula of Florida, so it can not be attributed to the curculio.

President Adams: I would like to ask in reference to this curculio. There is a curculio in the orange belt which strikingly resembles the plum curculio of the North. It is very destructive to Peen-to and other thin skinned peaches, but I am not sufficiently posted to know whether it is the same.

Mr. Hubbard: We have a dozen species of curculio in the peninsula of Florida, and they grow on the wild fruits and nuts, attack our wild plums, and it is probable some of that species are learning to attack this kind of fruit, but as yet the Northern plum curculio, which devotes its attention to the plum, does not appear at all in the peninsula.

Prof. P. H. Rolfs: We have some evidence that mutilating will make the Kelsey and other plums productive in our section of the country. You may produce it by plowing, or you may produce it by limb mutilation, pruning, in other words. We have not had enough experience to state it as a fact, still by certain process of mutilation we may be able to set fruit, which normally does not set.

S. G. Miller: Perhaps it would be a good idea to compare notes in different parts of the State. I represent Putnam county, and in our section the Kelsey is literally loaded with fruit, but there are plum trees, Satsuma's and Burbank's, which set little fruit; in our section I have never yet seen a full Satsuma plum tree; some call it a shy bearer.

Mr. Hubbard: I don't know of any species of insect attacking it in the nature of curculio.

*ORIENTAL PEARS.

Advantages Which May be Obtained by Grafting—Bearing Qualities of the LeCont in West Putnam.

Discussion under topic "Pears and Apples."

[SEE MINUTES PAGES 1 TO 6, ITEM 26]

Prof. P. H. Rolfs: Permit me to suggest, under this topic, that, in growing pear trees, the generality of horticulturists do not pay attention enough to selection in propagating. If you will take cuttings from any particular tree regardless of whether the tree is productive or not, so long as it is a LeConte, we will have orchards that are not productive just because the cuttings were taken from a non productive tree. I have some LeConte trees that I can not make fruit, although I top prune and feed them all the same. It is a very self evident fact to a horticulturist if I take cuttings from that tree I will have trees that will not produce pears. There are whole orchards taken from trees not productive, which can not be made to set pears. I wonder if that is not also true in regard to the grafting of plums. May we not have here something in regard to the plums which will not set. These pear trees I am referring to produced an abundance of bloom, but it would not hold; it is the nature of the tree. I think in selecting our pear trees, or our fruit trees, we need to pay more attention to that point. As we know all LeConte pear trees are from cuttings of the original tree, and hence are all a part of the original tree, and they are naturally somewhat self sterile; it is simply the old tree, and consequently their tendency is to become entirely sterile. I would say on the other hand LeConte pistils are very susceptible to foreign pollen, in other words the pollen from other pear trees is a good thing to bring into your Le Conte pear orchard, if the orchard does not produce as many pears as it should. It is a good thing to introduce some other variety as the Kieffer. The Kieffer blooms a little later than the LeConte, consequently some other pear a little earlier should be introduced into the LeConte pear orchard which is not productive enough. Under ordinary circumstances the LeConte pear tree is too productive; we should rather resort to thinning out the fruit than encourage setting. As I have a good many inquiries this year in regard to making LeConte pear trees bear, this would be an important subject to people, who contemplate setting out pear trees.

H. E. Anderson: I have about 45 LeConte pear trees on my place in West Putnam county that are bearing very heavily.

*NOTE—Pear growing is one of the important fruit industries of Florida. The subject of Pears, which was passed at the 1896 meeting without further consideration than is given in the discussion under the above head, has been fully covered at previous meetings. For further information regarding Pears see previous published Annuals of the Society, also Catalogue of Fruits on another page of this volume.—The Secretary

They bore very heavily last year, but they are bearing still heavier this year. Age may have something to do with the bearing of the trees. I know parties in our place, one party in particular, that had come to the conclusion that the pear trees would not bear on sandy soil, and he cut them down. Last year we had a dry season. About the time the pear trees were blooming last season I wet my trees, put on two barrels of water to each tree in the blooming season. This season I did not wet them at all, and this season there is a much heavier crop than last year. A gentleman who lived near my place, and had pear trees, said, you are not going to have any pears this season, and I took him out to see my trees. He could not see any pears on the trees, and I could not see them, but now you can stand off anywhere and see the limbs loaded down. With me they are bearing very heavily.

*GRAPES.

A Chapter of Experience from Different Sections of the State.

Discussion under topic "Grapes."

[SEE MINUTES PAGES 1 TO 6, ITEM 28.]

H. Von Luttichau: I had to give up grapes; they did not pay me well.

Prof. P. H. Rolfs: I would like to ask a question. Have the common wine grapes been grafted successfully on the native Muscadine grapes? Can it be made a success?

A member: I tried it and made a success for two years, after that the wild stock would grow out and the grafts would die.

A. W. Stewart: In our section, that is West Florida, we have had very good success with the grape. We have taken a great deal of pains there to prune them, to set them out and take care of them. Prune them properly, according to the variety; each variety requires different pruning. I am in favor of what we call the renewal system. I have practiced that and practiced it with success, and by this method I never have an old vine. The suckers last year made a vigorous growth and are loaded. My experience has been where you do not do that the vine gets old, worms attack it, the fruit is not as large, etc. We have no reason in our section to complain of the grape. The Delaware does very well; to be sure it is a small grape. The Missouri Riesling for a wine grape has done well. The Niagara with me has not given the satisfaction it ought; whether I am to blame, or whether the locality does not suit I am unable to tell. I have given it the same culture as I do the others, but it will not do well. The grape is like all other fruits, it requires cultivation, pruning and fertilizing; we can not raise grapes, or any fruit, without the use

*NOTE—The subject of Grapes, which was passed without further consideration at the 1896 meeting than is given in the discussion under the above head, has been fully covered at previous meetings. For further information regarding Grapes in Florida, see previous published Annuals of the Society, and the Catalogue of Fruits on another page of this volume.—The Secretary.

of a certain amount of fertilizer, and the land must be thoroughly drained. The wild grape will stand a low place but the improved grape must be thoroughly drained to make a success of it, a natural drainage, or if you haven't this, then artificial drainage. We have got good prices and I do not think we have any reason to complain.

C. A. Bacon: I think this grape business is one of those bugs the President spoke of, so far as the selling is concerned. I have beautiful grape vines, the black Scuppernong and the white; it keeps me busy extending the arbor. I have no trouble in raising grapes, and I don't think there is a much better grape than the old Scuppernong. I was never interested in the grape. I am shy of grapes; 40 cents a pound was a little too high for me.

Geo. H. Wright: Some people are more easily satisfied than others. My friend is satisfied with the Scuppernong. I like a higher toned grape myself. I put $7,000 in grapes, and it is in there yet. I have raised grapes for a good many years. I set out a vineyard of 20 acres, the majority of those were white Niagara; I have also several other varieties; not the Concord. I am not condemning the Concord on clay hill by any means. Others perhaps would condemn some other varieties that I would say I succeeded with. There is a great deal of difference in knowing how to grow grapes; what kind to use on certain soils, and how to fertilize. I have grown the Herbemont grape, and from a vine which was a two year old when planted have picked 70 pounds two years after it was planted. But there is no money in it, except in the manufacture of wine, and then you have got to pay your cultivators 2½ cents a pound; we can not do that. From the Niagara I have raised any where from five to twenty pounds to a three year old vine, but there is a difficulty we have to contend with in South Florida, they ripen in the wet season; black rot is one of our enemies. I have given up trying to grow grapes for market. There is money, I believe, in growing grapes in South Florida for wine making, but the majority of our first ladies nowadays are looking a little sideways at a fellow who makes wine, and I concluded I did not want to make any wine. But when they say they can not grow grapes in Florida, it is a mistake. When the vine gets old—it is an error about renewing it—we have not got any old vines in Florida. The grape vine well grown on properly drained land is not old at fifty years, and yet it can be renewed every two years without difficulty. I have grown five or six varieties of black grapes, and made just a little wine. I was advised by our church members to make unfermented wine. I put up 2,000 or 3,000 bottles one year. One of our preachers said, you can sell it for sacramental purposes. And I sent out a circular or postal card, stating I had unfermented grape juice, absolutely pure, and would furnish it at 75 cents a quart, bottled. I never got an order for a single bottle for that purpose, and concluded it was not the right kind for sacramental purposes. I have got some of it yet. We have the rainy weather to contend with. I have marketed grapes on the 6th of June; I have with another grape been in the market on the 10th of July. I have a cross that is a scientific cross between the Herbemont and Concord, which I think is a superior wine grape and table grape too. On a four year old vine I took off 120 pounds grown by itself. I believe in high fertilizing in grape culture in Flor-

ida; you can not use too much sulphate of potash, and you can not begin to use it any too early in the season, though I don't advise anybody to go into grape culture with the view of shipping the grapes to market.

Lyman Phelps: It is not every man who likes to confess his failure. In the grape business I had my experience before Mr. Wright came into the State, but it amounted to more than $1,000, and I stopped grape growing. We had dry seasons and it did very well, and then we had wet seasons and all these diseases ruined everything in a short time, and I hadn't enough back-bone to try again. I do occasionally hint it was a failure, but I have not said anything about grapes for the last ten years.

H. E. Anderson: I have about 100 or over of the white Niagara. I have an arbor probably 75 feet long on which we have at least a dozen different varieties of grapes, mostly the Concord. They have done exceedingly well for us all the time. I have taken a great deal of pains with them. Our Niagaras have done well, nice, fine bunches, and I know in one instance I saw a bunch of white Niagara as taken from a friend's grape vine that weighed 3½ pounds to the bunch. I consider that a pretty good bunch of grapes. I do not see any profit in grapes. We can not even sell them around our town; we can not get anything for them at all, but I should certainly think everyone would like to have a few grapes around him. I have also a Scuppernong arbor and have the white and black. I have a vine on the south end of black Scuppernong, and a white vine on the north end, that has been full of bloom just as long as the other and never borne anything, the other bears; that blooms tremendously heavy, and has for three years, and has never borne.

President Adams: It is probably a staminate variety grown from the seed and never will set fruit.

DISEASES AND INSECTS OF CITRUS.

Blight, Dieback, Sooty Mold, Scab—New Facts Regarding these Maladies and their Treatment, Derived from the Investigations of the Past Year.

Paper prepared and read by Herbert J Webber, Special Agent, U S Department of Agricultural Sub-tropical Laboratory, Eustis, Lake county, Fla., Chairman of the Standing Committee on Diseases and Insects of Citrus Fruits.—With discussion following.

[SEE MINUTES PAGES 1 TO 6, ITEMS 73 AND 74.]

During the past year the work on orange diseases, which we have been conducting at the Semi-tropical Laboratory, has been continued much as in previous years, blight, die-back, sooty mold, scab, and melanose receiving the most attention. Along with the study of these diseases considerable time has been given to observing the effects of the great freezes of the winter of 1894-'95, and noting the results of different methods used in resuscitating frozen groves. The notes which I give today are such as have been observed principally during the last year, that may prove of interest to the Society.

BLIGHT.

Among the various methods of treating blight the first which suggested itself and that which has been tried more than any other method is cutting off the withered limbs or cutting the tree back to the trunk. It is probably unnecessary to tell you that this treatment has proven entirely ineffective. In a disease having an appearance so similar to the blight of the apple and pear, which as is well known may be effectually cut out, it is not to be wondered at that many growers continue to follow the practice of attempting to cure it by cutting out the diseased portions. Some have advocated cutting the tree back to the ground and have insisted that if this is done the disease is cut out and the new sprouts come up healthy. While many instances are known of the complete failure of this method, yet some continue to advocate it. One of the effects of the 1894-'95 freeze was to give us a trial of this method on a very extensive scale. As almost all of the blighted trees throughout the northern and central portions of the orange region of the State were killed to the ground and largely cut off soon afterward, the disease in such cases should have been cut out and the new sprouts formed should be healthy. Exactly the opposite, however, has proven true. I have already observed numerous cases where the sprouts from old blighted trees are beginning to wilt and show the disease. The first case noticed after the freeze was in October of 1895. Thus about ten months after the freeze sprouts from blighted trees begun to show the effects of the disease, and now many blighted trees may be found to show the disease again. It is thus proven on a very extensive scale that the disease is at least in the lower portion of the tree and in the roots, if indeed it does not infect the entire tree.

It is well known that certain roots largely supply certain definite portions of the

tree top. As demonstrating this, salt throw on one side of a tree will take off the leaves on that side of the tree without affecting those on the opposite side. I have also demonstrated this very neatly with small orange seedlings in the following manner: A small bottle of eosine stain which is bright red in color and readily absorbed by plants, was sunken in the ground by the side of a small tree without disturbing the roots. A lateral root situated just below a comparatively large branch was then selected, and after cutting the end off immersed in the stain. Twelve hours later a careful examination showed that the stain had passed up the side of the plant on which the bottle was located, following a very definite course, and almost wholly into the branch situated immediately above, without passing in a lateral direction to the other branches. A second small branch attached to the main trunk near the first branch also received a small part of the stain. Many growers have probably noticed that if an orange tree receives an abundance of fertilizer on one side and but little on the opposite side the greater development is on the side where the tree receives the most nourishment.

All this goes to show that if certain roots alone be diseased probably only the branch or portion of the top which they supply will show the effects. One of the characteristic symptoms of blight is the withering of certain branches usually on one side of the tree. The disease seems to spread from this to adjoining branches until the entire top is affected. Even in this early stage of the malady cutting off the trunk at the base does not eradicate the disease. It is thus suggested to me that blight probably first attacks certain roots, the branches which these supply being those which first show the disease. As the disease spreads to other roots, of course the entire top ultimately shows the malady. As opposed to this idea of the disease being in the roots only, Prof. W. T. Swingle has found the leaves of blighted trees to show certain characteristic pathological features. These, however, might be induced by the diseased condition of the roots. All microscopic studies which we have thus far made have given only negative results.

The method of treatment which we have been suggesting for this disease is extirpation. All observations which we have been able to make, indicate that the disease is of a contagious nature. As this is the case and as we have no curative treatment it is quite probable that digging the trees up promptly, as soon as they show the first symptoms of the malady, and burning them root and branch is the best policy and would result in keeping the disease from spreading. Mr. James Franklin, of Monteverde, Fla., informs me that he has followed this method of extirpation for several years years past and that the number of new cases are becoming very much fewer than formerly.

EXANTHEMA OR DIE-BACK.

Previous to this die-back has not been known to occur in any other country than the United States, and here only in Florida and Louisiana. We know that this disease almost invariably occurs on trees near privies, stables, and chicken houses, etc., and it is surprising that we have not heard of its occurrence in other countries. Orange twigs showing the characteristic die-back lesios have recently been sent to me from several localities in California, thus proving conclusively that the disease occurs there. As many of you know, Prof. Swingle, my colleague, has been studying abroad for some months past; and is at

present at Naples where he is studying in the Marine Zoological Station. He has written me that die-back is very common in the vicinity of Naples. This is the first we have known of its occurrence in other countries. Mr. S. A. Cunningham, a member of this Society, and a very intelligent orange grower whom I know to be thoroughly familiar with die-back, informs me that he observed this disease in Jamaica last summer. Blight and die-back, he informs me, are both of common occurrence in that island. Mr. Thomas I. Potter, of the Trinidad Geological Service, has written me that die-back also occurs in Trinidad.

SOOTY MOLD.

Sooty mold or "smut," as it is sometimes called, which invariably follows attacks of the white fly or mealy wing, I have made the subject of special study since coming to the State. A general discussion of this disease was given in the 1894 Report of the Society followed by further notes last year, 1895. Some further features of considerable interest in the treatment of this malady have been discovered in the past year. In my paper published in the 1895 report of this Society I stated that the resin compound had given evidence of being a fairly effective wash. The resin wash, however, was the spray recommended as most effective, as the resin compound had not at that time been tested thoroughly enough to justify its recommendation. During the last year further experiments with the resin compound in the treatment of the sooty mold following the white fly, have been made; and I feel that we are now justified in recommending it as a thoroughly effective spray if it is properly prepared and properly applied. Several trees at Myers, Fla., were sprayed during the summer of 1895 with different strengths of the compound in connection with experiments in the use of the resin wash. The resin compound here gave apparently as good results as the resin wash. During the winter and spring of 1895 and 1896 about 25 acres of badly infected orange grove were sprayed at Palmetto, Fla., under my direction. The groves were sprayed mostly from three to four times, and the treatment proved very effective. It must be understood that in treating the sooty mold one must destroy the insect pest which it follows. The resin compound thus is effective in treating sooty mold because it effectively destroys the larva and pupa of the white fly.

The formula for the resin compound has been considerably simplified in the course of these experiments. The following is probably the handiest which we have used.

Resin.... ....8 pounds.
Sal soda (crystalline).... .....4 pounds.
Water.... ....1 quart.

After boiling add sufficient water to make five gallons of stock solution.

Place the resin and sal soda in a comparatively large kettle with one quart of water. Boil, meanwhile stirring briskly, until the resin and sal soda are thoroughly melted together and form a frothy mixture without lumps. Now add about four gallons of cold water, pouring it in rather slowly and with short intervals between to avoid chilling the mixture too suddenly. When all the water has been added, bring to a boil, then pour out the hot solution, straining it through a coarse cloth, and add sufficient water to make exactly five gallons of the solution. This if correctly made, forms a thick, dark brown, translu-

cent, syrupy solution, which may be preserved as a stock solution.

For use in treating the sooty mold following the white fly (Aleyrodes citri), di lute this stock solution in the proportion of one part to seven parts water.

Considerable has been said by some members of the Society relative to the treatment of the white fly and sooty mold by spraying with lime solution made by slacking lime in water. The lime particles in this case are held in suspension and the trees are white-washed by thoroughly spraying. This has been claimed by some to be an effective remedy. About the first of March, 1895, I sprayed a number of selected branches containing numerous living pupa of the white fiy with very strong lime solution. An examination a few weeks later showed that almost all of the pupa of the insect on the sprayed leaves had hatched, so this spraying apparently had no effect either in killing or preventing the pupa from hatching. It has been suggested that this treatment may be effective if the spraying is made very thorough and put on immediately before the flies hatch in order to render conditions unfavorable to their feeding and the depositing of their eggs. This method of applying the lime spray I have not yet tested and cannot judge of its merits.

In the Journal of Mycology, published by the Department of Agriculture, and in my paper read before this Society last year, I had something to say in regard to a parasitic fungus which attacks and kills the white fly. During the past year I have made many more observations on the action of this parasitic fungus which we may as well call by its scientific name, Aschersonia aleyrodis.* These observations seem to indicate that this fungus will prove an important factor in keeping the white fly and thus the sooty mold in control. Aschersonia attacks the larva and pupa of the white fly in any stage of development.

In the early stages of its infection the larva becomes very slightly swollen and whitish opaque in certain places. If at this stage a microscopic examination of the larva be made the mycelium of the fungus will be found to be very abundant in the body of the insect. As the fungus develops it bursts out around the edge of the larva which has by this time become opaque throughout, and forms a silvery white fringe visible to the unaided eye. In its further development the fungus grows up over the entire scale of the insect completely hiding it from view and ultimately so nearly absorbing all of the scale that the remnants are found only with difficulty. In this advanced stage the fungus forms a little hemispherical pustule on the leaf from one to three millimeters in diameter and about one millimeter high. The general color is a dirty salmon white. The spore masses, however, are bright coral red and form a number of conspicuous little spots on the surface of the fungus. Sometimes the spore masses are so large as to make the fungus appear red throughout. These reddish spore masses are made up of millions of very minute individual spores (seeds or germs) which are imbedded and held together in a gelatinous medium. These are easily loosened and washed away by rains and I suppose are carried from one insect to another in this way or

*NOTE—In previous publications this fungus was referred to as *Aschersonia tahitensis* Mont. A more careful study, however, has shown it to be a distinct species and it has thus been named *Aschersonia aleyrodis* Webber.

by ants. The reddish color would render them attractive to ants and the gelatinous material would probably serve as food, so ants might be led to visit these fungi and feed or attempt to feed on the spore masses and thus become covered with the spores. As they visit the larvae and pupae of the white fly for the honey dew which these secrete some of the spores would thus probably be transferred to the insects.

I have tried numerous experiments in transferring this fungus by hanging branches containing the white fly larvae infected with the fungus in white fly infected trees, etc., but so far without avail. There is some link in the process of transfer which we have not yet been able to discover. At present the only method we can suggest as being at all hopeful of success is the transferring of small living trees containing larvae of the white fly infected with the Aschersonia. By this method nature would be allowed to act and in all probability in this way we can succeed in introducing the fungus where it does not now occur. (Specimens of larvae of the white fly infested with Aschersonia aleyrodis were exhibited).

Fortunately I am able to announce the discovery of a second parasitic fungus attacking the larvae of the white fly which gives evidence of being even more effective than the Aschersonia aleyrodis. This fungus I lately discovered in a grove at Manatee, Fla., which is the only place where it is yet known to occur. It attacks the larvae and pupae causing them to swell much as in the case of Aschersonia aleyrodis, finally growing up over them forming a small depressed hemispherical body of a dark brown color very much resembling the Florida red scale in general appearance. What we may term a ground mycelium of this fungus spreads from a diseased insect in all directions on the surface of the leaf to a considerable distance and as this reaches other larvae and pupae of the white fly they in turn become infected and killed until all on the leaf have been destroyed. In this condition the entire under surface of the leaf, where the insects always occur in these stages, presents a silvery white appearance caused by the ground mycelium, with dark brown spots here and there where the individual insects are located. It is a striking and very interesting sight to look up into a tree, where almost every leaf presents this silvered appearance. So thorough is this fungus in its action when once introduced that it is very difficult to find a living specimen of the white fly on trees where it has obtained a good start.

The sooty mold, it will be remembered, follows all insects which secrete honey dew, such as the various wax scales, mealy bug, plant louse, etc., so that in the study of the disease we must study the control of these insects. The common turtle back scale (Lecanium hesperidum), which secretes honey dew and is followed by the sooty mold, I find is also attacked by a different species of Aschersonia, that in one case which has come under my observation, succeeded in eradicating the pest. This fungus is a true Aschersonia but has not yet been specifically identified. The wax scale (Ceroplastes floridensis) is also attacked by an Aschersonia (Aschersonia turbinata) which from such observations as I have been able to make seems to be very effective in keeping the pest in control. The subject of insect fungi, which is exceedingly interesting and important will occupy considerable of our attention in the near future and will I think form the subject of a special bulletin.

VERRUCOSIS OR SCAB.

Prof. W. T. Swingle has been studying this disease in particular, but his extended absence abroad has interrupted the work to some extent. Spraying with ammoniacal copper carbonate or weak Bordeaux mixture, as announced last year, has proven quite effective and will unquestionably be our main method of treatment. In the case of the lemon where scab causes the greatest damage, spraying should be begun early when the first fruits formed are yet quite small—about the size of a pea—and continued for a considerable period as the flowering does not occur at a definite time, but continues more or less through the season. Four or five sprayings at intervals of two or three weeks will be necessary. It is also important to systematically pick up all infected fruits not gathered for shipment and bury them some distance from the field or burn them. If sour oranges, which are particularly subject to this malady, occur in the vicinity of the lemon grove it will probably be advisable to remove them, as in this case both fruit and foliage are badly infected. If the lemons are on sour stocks sour sprouts which occasionally come up from the trunks, should be cut off and burned. The foliage of the lemon is but slightly affected by the malady.

INSECT DISEASES.

The many serious insect pests of the orange are being carefully studied by Prof. H. G. Hubbard under the direction of the Department of Agriculture. Such observations as I have made on this subject have been merely incidental, other than on those insects which secrete honeydew and are followed by the sooty mold. These I have quite carefully studied and a discussion of their treatment is given above under the discussion of the sooty mold. Several illustrations of the introduction of injurious insects into uninfected regions have come under my notice during the past year and the great necessity for having State laws governing the introduction and spread of injurious plant diseases and pests has been many times suggested to me. The spread of the Florida red scale, one of our most serious pests, might have been entirely prevented at one time had such laws been in operation. I cannot too strongly urge that this Society take some active measures to secure the passage of suitable laws which will in the future prevent the introduction of serious diseases and keep those which we already have in control.

DISCUSSION.

(The subjoined discussion followed the reading of Prof. Webber's paper).

W. S. Hart: In the case of blight, may one safely plant other trees in the places of the blighted ones which have been removed?

Prof. Webber: A healthy tree planted in the place of a blighted tree is apparently no more liable to contract the disease than other healthy trees in the same grove.

Mr. Hart: I would like to ask another question. You spoke of blight as contagious. I would be pleased if you would give us your reason for believing this malady contagious, and how you think it is conveyed. The freeze has shown that the disease is in the root. Would the concussion theory, curing by explosions, be effective as a cure here?

Prof. Webber: While it might prove effective for all of any evidence we now have, we, however, cannot assume that it will. I have yet to learn of any plant disease that has been successfully

treated in this manner. Most bacterial germs, I believe, can undergo any amount of concussion without affecting them. In regard to the evidence of the contagious nature of blight I will say that all the positive evidence we have is simply from continuous observation of infected groves. If one has taken pains to carefully observe the disease in any particular grove and watch its spread they will see that it spreads from one tree to another. When one tree becomes infected almost invariably the adjoining trees also contract the malady; spreading thus from a definite center. In spots in infected groves where a tree has been killed one always finds several new cases. It is impossible, after seeing this in many groves all over the State, not to come to the conclusion that the disease is contagious. With most contagious diseases it is possible by taking budwood from a diseased tree and budding it into a healthy tree to carry the disease, but in the case of the orange blight we as yet have no evidence that this can be done. At the time of the freeze we had a number of experiments going on, of budding in this way and many of the sprouts from these diseased buds had reached the age of three years, but so far had shown no indication of developing the disease. Unfortunately these buds were all killed by the freeze, and we obtained no positive evidence from them. All citrus varieties are apparently subject to the disease, but the sour orange is most resistant.

Mr. Hart: I would state that I made a good many experiments a year or two ago in regard to this matter. I cut off a large blighted tree, large enough to bear several boxes of oranges, and set it up against another healthy tree of the same size, so that the limbs interlocked, and left it there. I was willing to sacrifice a tree if I could be assured that the disease could be communicated in this way. Up to the time of the freeze I saw no effects of the disease on the healthy tree.

Prof. Webber: We have not been able to determine how the disease is carried. It has been intimated that it may be communicated by fusion of the roots under the soil. In one instance we found the roots of a blighted and healthy tree fused together. It seems quite probable to us that actual inoculation may come from this fusion of the roots under the soil.

Mr. Hart: The first two cases I ever had were two in one of my groves. The next occurred at the further corner of an adjoining grove. In the first grove affected there were only two or three instances of adjoining trees that were destroyed by it.

Prof. Webber: These sporadic cases are difficult to account for. How the disease is carried to widely separated localities is a question to be determined.

THE WHITE FLY.

The Woods and Swamps full of Insects which Cannot be Distinguished from the White Fly—Hence the Futility of Attempting its Extermination or Restriction by Drastic Laws.

Discussion under topic "Diseases and Insects of Citrus"

[SEE MINUTES PAGES 1 TO 6, ITEM 74.]

(The discussion here given followed the reading of Prof. Webber's paper on "Diseases and Insects of Citrus.")

A member: What is the size of the white fly?

Prof. H. J. Webber: The true fly is about one-sixteenth of an inch long; it is a very minute insect.

L. Montgomery: In regard to the secretion of the honeydew, is that a secretion of the pupa or insect itself or surplus fluid drawn from the leaf?

H. G. Hubbard: It is a secretion or more properly an excretion of the insect itself. Honey dew seems to be pretty well ascertained to be an excrementitious product. The juices of the plant taken into the body of the insect, are subjected there to the digestive action of the intestines and broken up. In addition to that part which is used in the blood to build up growing tissues of the body, there is produced a solid waste in the form of wax, and this passes out of the body through pores in the skin and forms a coating of wax on the surface. The remainder of the waste derived from the food is a liquid. It gathers in the hinder intestine and is expelled through the rectum. It is then called honey dew and is the only excrement voided by the white fly.

Prof. Webber: There might be some misunderstanding in regard to honey dew, in fact we have a plant Honey Dew. Certain plants have power to exude secreting fluids, and this is known also as honey dew. An orange tree if put in a green house in the night secretes a sweetish fluid; I thought possibly it might be created by the plant itself. I have made a careful examination to see whether that plant honey dew is of the same character as the sooty mold, but I have not found any indication that it is. I suppose when all evaporation is stopped by the moisture of the green house at night a honeydew is secreted.

Mr. Montgomery: Do you understand that mold to be a fungus that feeds on the honey dew secreted by the insect?

Prof. Webber: Yes. The fungus will not grow on the plant at all. I think if you will examine you will find it possible that the upper side of the leaves have the honey dew from the insect above; it is sometimes expelled with considerable force.

A member: The Professor has referred to the necessity of laws compelling persons to destroy these pests and mentioned an instance which is a very pointed one showing the absolute necessity for it. Our county commissioners recognized the ne-

cessity of taking measures to stamp out the white fly, and they appropriated money to do this, this past spring. The plan was to defoliate all infected trees; they appropriated money to do this and it was to be done gratis; everybody was willing to do it; the arrangements were all made; Prof. Webber came down there at the time appointed, and one gentleman who owned the largest number of infected trees positively refused to have a tree touched unless they gave him an indemnity bond of $100 a tree. The consequence is the white fly is flourishing on his trees. That shows the necessity of binding laws.

Mr. Montgomery: After the first freeze we had in Micanopy—I have a self registering thermometer on a gravel walk nine feet wide, and put the thermometer on the curb on the ground; it is not protected by anything. The first freeze my thermometer registered 12½—that was the December freeze—the February freeze my thermometer registered 12. I have had my thermometer hung in the same place when it registered 16, and there was hardly a tree hurt. The cold spell we had in December last that killed most of the sprouts, the thermometer registered 19. I asked Prof. Phelps a question in regard to a temperature of 20 killing trees. I know a temperature of 20 or 16 won't kill trees; our trees were not hurt. We would have been benefited by the first freeze. I noticed on a few leaves that they did not show that the pupa was fully alive before the February freeze. The Cape Jasmine we dug up, or defoliated them. A certain gentleman absolutely refused to let us cut off the Jasmine vines in his yard, although they were full of pupae. He had an English friend and I got this friend to ask his permission to take the leaves off and he permitted it. I am sure that the white fly will not winter over on any hammock growth, on any natural growth in Florida. I have seen them on the Magnolia in the summer, but not February or March.

Prof. Webber: After the people cut off the Jasmines, cut off the sprouts I mentioned to them certain other wild plants on which they grew, and we found a number existing at that time, after the freeze, we found them on the Magnolias and some on the Bays, and I found it so many times.

Mr. Hubbard: There are several species of Aleyrodes, which when young it would take an expert to distinguish from the white fly. I can not distinguish the larvae and the differences still remain to be pointed out. In our swamps and hammocks there are several species, which in their younger stages have never yet been distinguished from those of the young Aleyrodes of the orange. In their younger stages I see no difference. I am quite confident that the Aleyrodes of the orange where it does get on a plant which is not its normal food plant, will not winter through and produce the mature fly; it will go through alive, and you will find it alive in the spring, but it will not produce the mature fly except upon the orange and Cape Jasmine, and possibly a very few other plants. The white fly on the orange, however, has gone through the winter and the freeze, and matured flies in thousands of places in Florida, and in fact I am inclined to think there is no orange grove in this State in which the white fly was prevalent at all, in which it did not winter and produce white fly next year, but that does not mean it is still existent in every grove. It went through on the young seedlings scattered over the ground. Thousands survived even in groves that were killed to

the ground, because in almost all groves there were little seedlings of orange, having but one or two leaves, which got protection of one sort or another and escaped injury. On these I found the Aleyrodes after the frost, as larvae and these larvae produced the white fly the next season in our orange groves. We will have the white fly again as numerous as we had it before all over the State of Florida; there is no doubt about that. As to the effect of the cold on the white fly I do not know what temperature will kill it, I doubt if 10 degrees below Zero would have any effect on the hibernating larva. During the freeze I had a seed bed in a swamp, and no sun light struck the young plants, except in one or two little spots where a chance sun beam played over them part of the day. These plants were in young leaf during the freeze; they were frozen so stiff you could snap them with your fingers, and they were frozen that way for several days, yet all came through and went on growing except where the spot of sunlight played upon them. Many did not lose their leaves and on all the leaves living specimens of Aleyrodes survived the cold. I find out in our orange groves there passed unnoticed millions of little seedlings, which came up and never amounted to anything; they made a few leaves and died, but on these, the white fly survived. I think in a great many groves there are now no white flies at all, because they had nothing to thrive on, but in most of the groves where the old trunks were saved and where the white fly was bad, it will be bad again.

EXTERMINATING MOLES.

Remarks by C. A. Bacon under topic "Diseases and Insects of Citrus."

[SEE MINUTES PAGES 1 TO 6, ITEM 75.]

C. A. Bacon: It is said the mouse is mightier than the lion, for once upon a time did he not liberate the lion from the meshes of the hunters' net? Our experience for the past twenty years had about educated us up to the belief that the ground mole is mightier than man; for can he not destroy his season's labor, and handiwork in a day?

We have seen many remedies to destroy moles, and have tried many, but were not satisfied. There are traps and traps, but that is slow. We have tried dropping small pieces of fresh meat sprinkled with strychnine, in their runs, we were not satisfied. Our cracker friend said, take two cow horns, saw off the tips, leaving a small hole in each, place them in the mole run, the small ends together, the mole would go in, but never back out. That reminds me of our worthy President's story of the Dutchman's brick dust as a remedy for bedbugs; one asked him "how do you use it?" "Vel, you catch dem bedbug, and put de dust in he mouth." "Why don't you kill the bedbug when you have caught him?" "Vel, dat vas good too."

We saw the castor bean remedy going the rounds of the papers, and one man went so far as to say that, "one castor bean plant on a place would drive out all moles;" we did not believe that, but allow-

ed one plant to grow and when the seed matured, we planted the whole home acre in castor beans, and put them in heavy in our rose beds; we had a fine crop, and the moles put a fore-finger to their nose and closed one eye (hold on, they haven't any eyes, but they have a powerful nose). Then I began to think; it pays to stop and think sometimes, "let us reason together," I suppose that is the object of our Society, "a man can learn something from almost any fool." I have been told that the inner husk to the castor bean is croton oil, or has the same properties, a rank poison. We have also been told that the ground mole feeds entirely on animal matter; now what! Take the outer husk off the castor bean, punch a hole with the fore-finger in the mole run, drop in a kernel, and smooth the hole over; the mole smells the oil in the bean, thinks it a worm, eats it, and there he is, see? We now carry a handful of beans in our jumper pocket, and whenever we see a new mole run, (which is getting to be seldom) we drop in a kernel in two or three different places. We have found several dead moles on top of the ground since using this remedy. Do not be discouraged, keep at them, and you can clean them out. Skunks are good for moles, but what are skunks good for? We tried skunks, and came very near having to move.

ORANGE BORERS.

Discussion under topic "Diseases and Insects of Citrus."

[SEE MINUTES PAGES 1 TO 6, ITEM 77.]

A member called attention to a section of orange wood in the possession of Mr. H. G. Hubbard, showing the workings of the borer, and requested that he exhibit it to the Convention.

Mr. Hubbard: I brought this section of an orange tree with me to exhibit to members, because I wanted to get information from various parts of the State as to the borers in those trees which still have life in their trunks. I find they are very generally distributed throughout the State. This is a section of an orange tree, which was restoring its top, but the owner on finding that it was riddled with these borers concluded it never would make a good orange tree; the new shoots all came from the damaged trunk; and so he had everything cut off level with the ground. That is the process followed by a great many of the growers on Crescent Lake. I took a section of it and exposed the burrows by carving away the wood, to show just what the beetles have been doing in the wood. It shows that the trunk of the tree is completely riddled in every part. There are few, if any, of our trees that are not riddled as much as this sample shows; many of them are even worse. The only trees not bored are those which were killed too quickly for the borers to get in their work. I supposed at one

time that as the insects were still alive they would continue their work when the weather grew warmer, but certain discoveries I have made quite recently in connection with their food, make me feel certain we will not have a return of the borers until the next freeze. They are starving for the lack of food. They do not live upon the wood, they live upon a minute fungus which they raise in their galleries. The beetle in all its stages of life lives exclusively upon a fungus growth, which has been called Ambrosia. It forms a jelly-like lining in the galleries, and it is necessary for its propagation that the tree should still contain some sap. The borers can raise their fungus also in wine barrels, as the vinous ferment which saturates the wood furnishes the proper pabulum. It is also necessary that the living insect should be in the wood in force. I took specimens of the Ambrosia fungus to the Division of Vegetable Pathology at Washington, but they have not as yet been able to make a culture of it for study, outside of the galleries of the beetle. A disease has now attacked the food of these beetles in the trees, as fast as it grows it is attacked by a bacterial ferment; it sours or spoils like milk, becomes thickened, and the galleries are stopped up. And thus the beetles are being starved and smothered to death. I can not learn that anybody has seen a bit of fresh saw dust shoved out of the live trees since last fall. Notwithstanding that, there are living borers in our orange trunks still, and there is still some Ambrosia forming, but it is quickly overwhelmed by the bacteria and the beetles are weak from want of proper food. Not one in ten thousand will escape or will ever be able to start a new colony.

C. A. Bacon: Where a tree is badly infested with this insect, but has a thriving top, you think the tree will go through and eventually become a good, thrifty tree?

Mr. Hubbard: I do not believe any part of such trees will prove good in the long run, except what comes anew from the ground. I think such trees will fail when they try to bear heavy crops. I wouldn't give 10 cents for any tree trunk that is riddled with the borers. It will be swarming in time with white ants (wood lice), and is so severely injured that the interior portions of the wood are beginnnig to rot, and will form a hollow. At any rate all the live wood is merely a thin film; and although new wood is forming and is even closing up the holes of the borers, still I do not think it can make wood fast enough to support the enormous weight; I do not think they will have strength enough to bear the branch top.

A member: Is this the same borer that attacks the wine barrel?

Mr. Hubbard: Yes. There are several different kinds of these borers; in that one piece of wood are two or three, and four or five are concerned in the attack on our orange trees. They are very closely related however.

A member: I had some Niagara grapes, and made some nice wine for myself and friends, and one morning it was all over the floor, and I began to inquire about it. I found it was borers. I got a clean whisky barrel, and the borers went in that, and I painted the outside of the barrel, but that gave the wine a bad flavor, and I want to know if it was the same borer that attacked the orange trees?

Mr. Hubbard: The same, or one of the same.

W. S. Hart: I had a great deal of experience with these powder post insects or

borers, in my honey barrels. When I first began to produce honey by the barrel full I generally had oak barrels, and they proved failures; they would not answer. Honey has such an affinity for water that it will shrink the wood; you have to drive the hoops up every week, and after a while the staves will not meet around the head. I tried coopers, who said they knew they could make them hold, and would warrant them, but still I have lost a half barrel of honey at a time from their barrels and got no redress. Myself and other bee keepers were very often bothered by these little pin holes through the staves. We learned that the trouble is all from the effect of moisture in the wood that sets up a ferment. If you take a whisky barrel, after the contents has been drawn out, bung it up and put it under cover, just as long as you keep it dry, they will not bother it. If you had set it on the ground, last summer in a few hours you would have found perhaps fifty of the beetles going in next the ground. I will say for anyone interested in the matter of keeping honey, cypress barrels waxed inside with parrafine are good, or Northern spruce makes just as good barrels. I never had a barrel in my honey cellar, either oak or anything else put in there in a proper condition, that was punctured by these borers. When I first discovered the borers operating in the orange trees I cut off a piece of the tree and followed their burrows and found the insect. I will say my trees have got large tops above the bud; they have got oranges on now; they look as though next year they would bear two or three boxes of fruit perhaps, but if they are not worth ten cents I am sorry to hear it. I certainly would not take many times that for them. Most of those trunks are sound up some distance above the lowest limbs.

Mr. Bacon: I would like to inquire of Mr. Hubbard if in his opinion, these borers have visited to any extent wood that had vitality enough to be of use to the tree.

Mr. Hubbard: I don't think they would attack a tree that had vigorous life in it. Their burrows promote decay in the heart wood of trees that might recover and otherwise make sound trees again.

A. W. Stewart: They work the same way on the pear; where there is some vitality left in it they commence on that, but I don't think they work on a good, sound tree. A tree that is perfectly sound all over I never heard of them working in; it is only where it is defective.

A member: Isn't this borer always working in sour sap or moisture and never in healthy sap? I have noticed in the North what would indicate that to be true.

Mr. Hubbard: Yes, I think that is true, the sugary ferment of the sap is necessary to the production of their food fungus in wood. Therefore they attack dying or sick trees or parts of trees.

L. Montgomery: I don't think a borer ever kills a tree. It is the cold that kills the tree and not the borer. I have some trees situated on the east side of a large house—if you remember the freeze of '86 it was cloudy all the time; there were perhaps one or two days that we had some sun; the trees on the east of my house were cut back by the freeze to near the ground. They were then attacked by the borers; they were so numerous it gave me a great

deal of concern. I supposed the trees would be killed by the borers, but the cold was not sufficient to kill them, they went on and got to be as good trees as any I had.

Mr. Hart: I am very glad to hear that as it relieves my mind after Prof. Hubbard's estimate of the value of trees so attacked. Probably I misconstrued his remarks.

SOME EASILY GROWN ORNAMENTAL PLANTS.

Paper prepared and read by Mrs. P. H. Rolfs, of Lake City, Columbia county, member of the Standing Committee on Ornamentals.—With discussion following.

[SEE MINUTES PAGES 1 TO 6, ITEM 68.]

It is my purpose to call your attention to plants that experience has proven can be successfully grown in Florida. In selecting these I have tried to choose only such as will stand a light freeze, and have given preference to those which can be made attractive during almost the entire year.

ALYSSUM.

First, I want to mention the sweet alyssum. This is one of the most easily grown of our garden annuals and one with which all are familiar and yet few realize its true value when used as a border plant or massed in beds. In fact I am afraid the cheapness of the seed (five to ten cents per packet) and the little care required to bring this plant to perfection, leads many to think it not worth cultivating; but when a mass of snowy whiteness is seen in midwinter, and we learn that it is a bed of sweet alyssum that claims our praise, we are anxious to know more about it.

With this plant, we can so arrange as to have it in blossom every month in the year, as seed sown in October and November will give plants for winter blooming, and seed sown in January and March will provide them for summer blooms. It being an annual we must not forget to keep growing new plants, as when a seed sprouts and springs forth to soon give us countless little blooms, perfect seed, etc., its vitality is spent. We can not revive the old plant, but we are furnished with an abundance of seed from which to grow new ones.

The seed may be sown where plants are wanted, but with these as with all fine seed it is better to sow in cold frame, or some place where plants may be protected from frost or heavy rains, until one to two inches high. They are then ready to transplant to open ground where they should be set about eight inches apart and given rich soil and plenty of water.

During the past winter when nearly every flowering plant was killed or checked by the frost, what a treat it was to gather the delicate sprays of the sweet alyssum and inhale their delightful fragrance.

A very charming bouquet is produced

by carelessly placing them in a low vase. The stems should be cut to allow the tiny heads to stand about an inch above the water. If the dish can be covered with coarse meshed wire the arrangement requires but little care, merely inserting the sprays here and there as naturally as possible. If wire is not used a convenient plan is to fill the dish with excelsior or what is still better the sprays of some green vine. These provide a good bed into which the stems of the Alyssum may be placed.

AGERATUM.

This is an annual from which much pleasure may be derived in summer and early fall. For summer borders the seed should be sown in March, and when the plants are about four inches high cuttings may be taken off and rooted. These cuttings root easily but it will be necessary to supply moisture during dry weather, and protect them from the sun. In a few weeks the cuttings will be ready to supply cuttings. Proceeding in this way, a single package of seed will give many plants by the first of July. There are pink, blue and white varieties which blend perfectly and make a pleasing combination.

The Ageratum requires about the same treatment as Alyssum and proves equally as good for borders or to be massed in beds. The cut flowers may also be effectively used in bouquets.

ALTERNANTHERA.

The Alternanthera has proven itself to be well worthy of cultivation. This is known by various names, such as burning bush, Chicago fire, etc., but is most frequently called border plant, I suppose from its perfect adaptability for borders. It is unequalled for planting out fancy designs. By securing plants in April and making cuttings as rapidly as possible, a quantity is soon at command. An important fact in regard to this plant is that while it thrives in almost any situation, it will do exceedingly well in poor soil and with but little water.

During the freezes of 1894-'95 a bed of it was covered with leaves and trash. While it suffered severely, enough was saved to plant out in April, a border of about 15 feet in length. This was clipped in June and clippings used as cuttings from which about 800 feet of border was made. Thus you see how rapidly it may be increased. In our State Alternanthera is not attractive, until cool fall weather, about October. From that time until frost it receives unlimited praise.

There are several varieties but all depend upon cool weather for their beauty. In getting a start of these it is well to obtain as many varieties as one can to propagate from. To make a good looking border it is best to plant them about four inches apart. They will soon meet at this distance and will need frequent trimmings to keep them at their best. The grouping will have to be varied to suit the particular condition. Usually the more modest colors are better for the foreground and the brilliant ones in the distance.

Most people grow tired of a border of a single plant throughout the entire year. It is a decided relief to plant a border of beds or along a walk to Alyssum before the first killing frost, so as to have the Alyssum in bloom when it occurs. Then another row may be planted in March and the first row removed when the second begins to bloom well. In May or June a row of Ageratum may be planted six or eight inches inside of the row of Alyssum. The

plants will make a matted border in about six weeks if set about eight inches apart, when the Alyssum should be removed. Under proper care these plants will bloom until frost occurs, but about the first of October Alternanthera may be set where the Alyssum stood; these will make a matted border by the first of December, when the Ageratum should be removed.

COSMOS.

Many of us have been at a loss to secure cut flowers for bouquets during the summer months. This want is supplied if we take the forethought to grow a bed of cosmos.

The seed should be sown in March, April and May, and young plants transplanted when two to four inches high. Set plants a foot or eighteen inches apart in rich soil and water freely. By crowding, we get a long flowering stalk which is a decided advantage in making up a bouquet. For use in church bouquets but few flowers prove more attractive. Its very simplicity makes it beautiful. The mass of green feathery clear cut foliage is of itself very attractive, but when the beautiful pink or white blooms three inches across are to be seen dotted here and there, the effect is very pleasing to the eye. A dozen or more of these flowers on their long graceful stems make a much admired bouquet.

SOLANUM WENDTLANDII.

A very charming plant of recent introduction from Africa is Solanum Wendtlandi. The individual flower is of the same type and shape as Solanum Jessaminoides and Irish potato. The corolla which is sometimes two inches across, is a beautiful mauve color. Of these exquisite flowers there are often a hundred or more in a single cluster and countless buds still remain. A cluster will frequently give blooms for two weeks and they continue to appear until frost.

It may be propagated from cuttings of matured wood. These cuttings should be made during warm weather as they are hard to root without bottom heat, during winter. After the cuttings are rooted they can be kept in a half dormant condition during the winter by covering with leaves and mulching, but it must be kept dry enough not to smother the plant. The large plant that has grown the summer before should be pruned back to the firm wood before the first frost occurs and covered with dry leaves or moss and then with earth. Keep the mound dry until all danger of frosts is past, then uncover and force along rapidly. These plants will bloom in six or eight weeks, thus coming in much ahead of the cuttings. Thirty-five degrees F. will injure the foliage and blossoms and thirty-two F. kills this plant.

DISCUSSION.

(The discussion given below followed Mrs. Rolf's paper).

H. G. Hubbard: In our experience with the Sweet Alyssum after the plant has run up a foot in height, we find they sprout, and we do not have to go to work to plant seed.

E. O. Painter: For the benefit of the ladies, who like Pansies, we have had considerable experience with them, and have raised them with all the beauty and variety they have been raised anywhere, and do it right outside in the open sun without any protection or shade of any account. It was supposed they must be put in some shady

nook to develop. The heavy foliage is cut off started in boxes. We have a spraying hydrant in our particular bed, and every few days for about fifteen minutes we let the water spray them. I find with plenty of water there is no trouble to raise an abundance of Pansies, even in our sun.

Geo. H. Wright: I thought the first few years in Florida I could not have Pansies, for the past years we have done well with them. Get porous soil and keep it moist.

ORNAMENTALS FROM THE TROPICS.

Strictly Tropical Shrubs and Plants that adapt Themselves to our Climate.

Remarks by H. G Hubbard, of Crescent City, Putnam county, (Special Agent of the U. S. Department of Agriculture), with discussion.

[SEE MINUTES PAGES 1 TO 6, ITEM 67.]

H. G. Hubbard: The experience of the severe freeze of 1895 has proved that very many ornamental shrubs and plants, which are strictly tropical, are yet adapted to our use in ornamental grounds and gardens in Florida, inasmuch as they are able quickly to restore themselves after being frozen down. Being unable to withstand frost they are quickly killed to the roots, but the roots remain uninjured and the plants quickly rise again and rapidly restore themselves, often regaining their full vigor and beauty in one season. Furthermore many tropical plants seem to possess sufficient intelligence to learn by experience, and after having been frozen down a few times they acquire the habit of resting during the season of danger, in midwinter; or otherwise to accommodate themselves to the vicissitudes of our climate. A notable example of this is seen in the Giant Bamboo (*Bambusa vulgaris*). This is a strictly tropical plant, which has proved exceptionally well adapted to our soil and climate, so that in this State it reaches a height of 72 feet, which exceeds by several feet its greatest recorded height in its native home, or in any other country. The behavior of large roots of this Bamboo after the great frost of '95 was very peculiar. As if aware of the necessity of making a sufficient amount of leaf growth to support the great mass of roots, it sent up a set of canes early in the spring; these grew about 20 feet and matured, then in July these canes feathered out, that is they made side branches and dense foliage. In addition the plants sent up in July, which is their natural growing time, a second lot of canes, which reached a height of 30 feet. The usual habit of the Bamboo is to make no growth before the 15th of July. It then sends up its canes which reach their full height of over 70 feet in 60 days, that is to say by the middle of September. After this date all the buds that start out of the ground perish, and no more growth is made until the July following. The canes in their first season are erect, with few branches and with only terminal leaves. The second season the canes feather out and become heavy with foliage and curve

over gracefully. This is the usual habit of the plant, but as we have seen after severe cold the plant adapts itself to the emergency and entirely changes its habit by sending up two crops of canes, the first crop maturing and making a foliage growth in the same season, thus restoring the balance of the plant. I mention this case of the growth of the Bamboo as a type of the way in which many tropical plants will adapt themselves to the emergencies in our climate and restore their beauty in one season after cutting frosts. Many other cases might be mentioned of tropical plants thus learning to accommodate themselves to our climate with its occasional frosts.

It is also my experience with ornamental tropical plants that they learn gradually to accommodate themselves to our cold snaps in winter; they really seem to show intelligence in many cases; they learn by experience. After a tropical plant has been killed down several times it is not so likely to get caught again; it will harden up in the winter. I have tropical plants, which used to be killed every winter, but which now go through most winters unharmed, and only get caught in the very severe frosts. Among those which are economically important, is the Mango, a tropical fruit. I am fully convinced that if we persevere we will raise the Mango as far north as Palatka. In the course of a series of years the Mango is accustoming itself to be frozen down. They gradually harden themselves as they are planted farther north. My first plants were from West Indian seed, and they stood no frost at all. Seedlings from Key West did better. I had plants from seed obtained on Indian River that stood several rather hard frosts. Now I have good sized plants raised by myself from seed grown north of Tampa Bay, and these plants with some protection, survived the frosts of '94-'95, and are up again from the roots. If I can succeed in getting seed from them in Putnam county, I will have a nearly hardy Mango.

DISCUSSION.

(The discussion given below followed Mr. Hubbard's remarks).

Geo. H. Wright: With reference to what Mr. Hubbard has said in regard to tropical plants, there was a Royal Poinciana at Orlando which was fully six inches before the freeze of '94 which killed it nearly to the ground, and the February freeze took it clear down, but it has thrown up a new sprout fully twelve feet high, and is becoming a very beautiful plant, which shows the adaptability of tropical plants for Florida climate and soil. I believe they can be brought to a hardier state than when first introduced into the country. I believe in that theory.

*TROPICAL FRUITS.

A Brief Account of the more Important Fruits of Extra-Tropical Florida.—With Some Notes on Culture and Present Condition.

Paper prepared by W. A. Marsh, Superintendent State Experiment Sub-Station, Myers, Lee county, Chairman Standing Committee on Tropical Fruits, and read by the Secretary.

[SEE MINUTES ON PAGES 1 TO 6, ITEM 35.]

Mr. President and members of the Florida State Horticultural Society: I hope that the other members of the Committee on tropical fruits will be able to produce more and better information than I feel I am able to give on this subject. The tropical fruits in the vicinity of Fort Myers are recovering from the effects of the cold nicely, except the Cocoanuts, of which many have passed over "the great divide." Of the Mango and Avocado Pear there will be considerable fruit this year, and our main stay, the Guava, will again be in reasonable abundance. I will confine my paper mainly to the origin and description of tropical fruits cultivated in Florida. I am indebted in a great measure to the "Origin of Cultivated Plants," by Alphonse De Candolle, for assistance in preparing this paper.

THE ALLIGATOR OR AVOCADO PEAR (PERSEA GRATISSIMA).

This is one of the most highly prized of all tropical fruits. It belongs to the order of Laurineae. The fruit is sometimes round, also pear-shaped, containing one large seed about the size and shape of a hulled walnut. The fruit when mature varies in color from a bright green to a deep rich brown, sometimes mottled with both colors. Its flesh is a vegetable marrow, sometimes called midshipman's butter, and held in various degrees of appreciation by different persons. Some say that an Avocado Pear, a slice of toast and cup of coffee is all they want for breakfast. Others place the Avocado Pear and a bar of soap at par. So you see "it is all in the bringing up."It is also used as a salad, being dressed with pepper, salt and vinegar in which style it is relished by most people. The tree is of stately growth, often reaching the height of forty or fifty feet in Florida. The leaves somewhat resemble the Chestnut in shape and size, and the young growth is of a rich wine color. The bark of mature growth is rough like that of an oak, while that of the young wood is a bright glossy green. It is an American fruit; was introduced into the gardens of Spain in 1601, and into the Sunda Isles about the middle

*NOTE—The subject of "Tropical Fruits" has been fully considered at previous meetings of the Society. For further information as to this branch of the fruit industry of the State, see the previous published Annuals of the Society, also the "Catalogue of Fruits" on another page of this volume — The Secretary.

of the eighteenth century. At the beginning of the eighteenth century this tree did not exist in the gardens of British India. In America its actual area in a wild state is of uncommon extent. It has been found in forests, on the banks of rivers and on the seashore from Mexico and the West Indies to the Amazon. At the time of the discovery of America, it was found both wild and cultivated in Mexico. According to Hernandez. It was also cultivated by the people of Peru under the name of Palto, but there is no proof that it was wild in that country.

MANGO (MANGIFERA INDICA).

The Mango is one of the best of tropical fruits, and belongs to the same order as the Cashew; this tree, however, produces a true fruit something the color of an apricot. The shape of the fruit is that of an enormous Lima Bean, although larger at one end than the other. It contains one large, hairy seed. The flesh of the more common sort is full of this fibre, while that of the finer varieties is comparatively free from it. The green fruit is stewed and made into sauce and pies, also a kind of relish called Chutney is made from it. The tree is a native of the south of Asia or the Malay Archipelago. There is a multitude of varieties cultivated in these countries, also a number of ancient common names. The comcom name in Ceylon is (Ambe); the Sanskrit (Arma); the Persian and Arab (Amb); the Malay (Mango). The variety of these names argues ancient introduction into the East Indian Archipelago. The true Mango is indicated by modern authors as wild in the forests of Ceylon. In the new world it was first introduced into Brazil, for the seed were brought thence to Barbadoes about the middle of the last century. A French vessel was carrying some young trees from Bourbon to San Domingo in 1720, when it was taken by the English, who took them to Jamaica where they succeeded wonderfully. At the end of the seventeenth century it was not cultivated in Cayenne, but now there are Mangoes of the finest kind in this colony. They are grafted, and it is observed that their seeds produce better fruit than that of the original stock. It is very difficult to describe the flavor of a Mango. If the fruit is not fully ripe it will taste as though it had turpentine in it, but to those who know the fruit in its perfect state it is delicious.

GUAVA (PSIDIUM GUAIAVA).

Ancient authors, and some later botanists admitted two species of this fruit tree of the family of Myrtaceae. One with round fruit of red flesh, the other with pear-shaped fruit and white or pink flesh. Now it is decided that all form but a single species. The origin of the Guava presents in the highest degree the difficulty which exists in the case of many fruits of its naaure. Their fleshy fruit attract omnivorous animals, in which way the seeds are scattered in places far from cultivation. Those of the Guava germinate readily and fruit in the third or fourth year. It has thus spread and is spreading by naturalization, especially in those tropical countries where it is neither very hot nor very damp. It is evident that the Guava is an American plant. Out of sixty varieties, all those that have been carefully studied are American. They have been mentioned as wild in the Malay Archipelago, although everything goes to show recent naturalization. It is more difficult to discover from what part of America it originally came. In the present century it was undoubtedly wild in the West Indies, Mexico, Central Amer-

ica, and all the warmer portions of South America. It is probable that its most ancient habitation was from Mexico to Columbia and Peru, possibly Brazil. It is now considered one of the indispensable fruits of South Florida, being canned, made into jellies, catsups, pickles, and preserves, and used to be called the peach of Florida, although this name will hardly apply at the present day.

PINEAPPLE (ANANASSA SATIVA).

And now we come to the queen of all tropical fruits, the Pineapple. It is without doubt an American plant, and was early introduced by Europeans into Asia and Africa. Nana is the Brazilian name, which the Portugese turned into (Ananas). The Spanish called it Pinas from its resemblance to a pine cone. All the early writers on America mention it. Hernandez says, that the pineapple grows in the warm regions of Hayti and Mexico, and mentions a Mexican name (Matzatli). The Chinese cultivated it in the seventeenth century, but it is believed to have been brought there from Peru. It has been found wild in the upper Orinoco valley, in Guiana, in the Province of Bahia and the Province of Veraguas near Panama. In Florida it is cultivated extensively on the east coast in the open field and in the interior of the State under sheds. Some of the varieties most in favor are: Abbaka, Smooth Cayenne, Enville City, Golden or Egyptian Queen, and Black Jamaica. There are more of the Red Spanish grown than any other variety, because of its being plenty and cheap. The growing of this fruit is no doubt one of the most profitable industries in the State, and very soon there will be needed canneries for disposing of the fruit. The ripe fruit is delicious when canned or made into preserves. There is also a cordial made from the juice that is a splendid remedy for indigestion. The cost of shedding the land ranges from three to five hundred dollars per acre, and the plants cost from one cent to forty cents each, according to variety. It will cost from six hundred to three thousand, five hundred dollars per acre to carry the plants to the first crop; after that the total expense would not exceed two hundred dollars per acre. One acre will produce inside of two years plants sufficient to set ten acres. The cost of fertilizing is about one hundred dollars per acre each year. Three tons should be applied in six applications, thus giving a steady supply of food. It has been found at the Ft. Myers sub-station that this method gives the best results. A very good fertilizer for the Pineapple is 900 pounds cotton seed meal, 700 pounds bone-black, 200 pounds nitrate of soda, 200 pounds H. G. sulphate of potash. The pine is not particular what it eats. Tobacco stems, ground, are good, acting as an insecticide, as well as a fertilizer ; and a fertilizer mixed as follows, would be good: 800 pounds ground tobacco stems, 400 pounds cotton seed meal, 500 pounds blood and bone, 100 pounds nitrate of soda, 200 pounds H. G. sulphate of potash. A good many growers use a great deal of stable manure, and the kind of fertilizer that is best must be settled in part by each grower, for the soil in which the Pineapple is grown varies to a great degree. The estimates of cost of production given are for plants under sheds, for in this way the greatest success has been attained in growing this fruit.

BANANA (MUSA SAPIENTUM).

The Bananas were generally considered to be natives of Southern Asia, and to have been carried by Europeans to America, till

Humbolt threw doubts upon their purely Asiatic origin. In his work on new Spain he quoted early authors, who assert that the Banana was cultivated in America before the conquest. He admits its introduction by Father Thomas of Berlanges from the Canaries to San Domingo in 1516; also that there is no mention of the Banana in the writings of Columbus and other early voyagers. Humbolt adds from his observations "On the banks of the Orinoco, between the mountains of Esmeralda and the banks of the River Cavony, in the Indian tribes, who had no relations with the whites, were found plantations of Manioc and Bananas." It is maintained by good authorities, that there is no structural difference in the Bananas cultivated in Asia and America. They are arranged in two groups, the large fruited, which grow from seven to fifteen inches long, and the small fruited from one to six inches, commonly called fig bananas. Some of the small fruited varieties bear fertile fruit and are found wild in Asia, while none have been so found in America. The Banana was probably introduced into Brazil from the Congo region. In Florida it is not grown to any extent, although it would seem that there might be locations in the extreme southern portion where it might be profitably cultivated. The Horse Banana and Hart's Choice will endure quite severe frosts and still produce fruit. The Cavendish, a dwarf sort, is the variety mostly cultivated in the southern part of the State.

PAWPAW (CARICA PAPVA).

The Pawpaw is a large herbaceous plant rather than a tree. It has but a single trunk and very rarely throws any branches. The leaves look very much like those of the Castor bean. The Pawpaw is a dioecious plant, although the plant bearing the staminate flowers does give some perfect blossoms. The flowers on this plant are borne in panicles, while those of the plant producing perfect flowers are in the axils of the leaves. The fruit sometimes weighs two or three pounds, is somewhat pointed at the blossom end, of a yellow color when ripe, and sometimes contains as many as a thousand seeds. The fruit is insipid, but makes nice pies, and when peeled, sliced and sprinkled with sugar and cream it makes a delicious dessert. It has been known to attain the diameter of two, and the height of twenty feet in Florida. The juices of the fruit and leaves are rich in vegetable pepsin, and a slice of tough beef placed between two broken leaves soon becomes tender. Oh, what a boon to Floridians. The plant flourishes in any location where it has good drainage, fair protection from frost, and plenty to eat. It is now grown in all tropical countries even as far as 30 to 32 degrees of latitude. The Pawpaw is an American plant and was cultivated in Brazil, West Indies and Mexico before the arrival of the Europeans. The plant is of rapid growth and will commence to fruit within a year if conditions are favorable.

There are numerous fruits of merit, which I can only mention, such as Jamaica Apple (Mamea Americana), Surinam Cherry (Eugenia Mitchelli), and the Anonas. I have taken too much time already for I feel that there are others who are better able to do this subject justice.

NOTES ON PINEAPPLES AND THEIR DISEASES.

Special paper by Herbert J. Webber, Special Agent, U. S. Department of Agriculture, Sub-Tropical Laboratory, Eustis, Lake county, Fla.

[SEE MINUTES PAGES 1 TO 6, ITEM 56.]

The pineapple industry probably ranks second among the fruit industries of peninsular Florida, and it should thus be given considerable attention in the meetings of the State Horticultural Society. It has seemed to me that the orange industry has been given rather more than its share of attention and it is largely for this reason that I present the following notes.

In the preparation of a paper on general pineapple culture, under the direction of the Department of Agriculture, I have had reason to make a very careful estimation of the extent of the pineapple industry in Florida. The results obtained may be of interest to the Society and should at least be put on record somewhere in the Proceedings. This estimation of the acreage under cultivation in the State is based on lists of growers and the acreage under cultivation by each, which have been kindly furnished me by intelligent growers in each section, and may be considered as a fairly accurate estimate. The total acreage at present is about 2,389 acres. The distribution of this acreage is about as follows: Avon Park and Pabor Lake region, about 100 acres; Florida Keys, about 300 acres; Myers region, three acres; Orlando and vicinity, 30 acres; East coast, the remainder, 1,956 acres. No very careful estimation of the extent of the shedded acreage in the State has been made, but from personal observations in all of the pineapple regions of the State, I think there are about 100 acres shedded at the present time.

ANNUAL FRUIT SHIPMENT.

According to records of shipments of pineapples over the Florida East Coast Railway, 36,494 whole or barrel crates were shipped during the season of 1894, and 4,258 whole or barrel crates during the season of 1895. These figures were kindly furnished me by Mr. W. J. Jarvis, General Freight Agent of the Florida East Coast Railway, and are exclusive of express shipments, no record of which was retained by the company. According to information kindly furnished me by Mr. F. B. Papy, General Freight Agent of the Plant System of Railways, the Plant System handled the following amounts: For the year ending June 30, 1894, 46,209 crates; for the year ending June 30, 1895, 12,835 crates. These figures also did not include a record of the shipments by express. As the fruit handled by the Florida East Coast Railway is forwarded largely over the Plant System it is probable that the 46,209 crates handled by the Plant System during the season of 1894 may be considered to largely include the quantity handled by the Florida East Coast Railway. A small portion of the crop was probably forwarded from Jacksonville

over other railway systems and the Clyde Steamship Line. Practically all of the fruit from the Keys during 1894 was sent by steamer from Key West, thus this quantity is not included in the estimate of the Plant System. It is probable that at least 10,000 crates were shipped which were not included in the shipments of the Plant System. The total crop of the State for 1894 was thus about 56,209 whole or barrel crates, or about 3,000,000 fruits. During 1895 a similar estimate indicates that about 22,835 crates were shipped from the State. This decrease is of course due to the destruction caused by the two severe freezes of the winter of 1894-'95.

PINEAPPLE BLIGHT.

Pineapple blight is one of the most serious maladies with which pineapple growers have to contend. It attacks almost all varieties, particularly the fancy sorts, causing the leaves to change color, wither and dry up. Plants so affected frequently fruit prematurely, forming small worthless fruits; or sometimes do not fruit at all. How long the disease continues before killing the plant has not yet been observed. The Queen (Golden Queen, Egyptian Queen, etc.,) is particularly subject to the malady, and when attacked becomes markedly redder than normally. The leaves finally begin to die back at the tips, the outer ones being first and usually most affected. This discoloring and dying back gradually spreads to the inner leaves and the new leaves as they are formed. In connection with this malady I find that the winding of the roots around the base of the stem, or "tangle root," is of very frequent occurrence. It is so commonly present in diseased plants that I think it can be considered one of the symptoms of the malady though I hardly believe it to be the cause of the disease. In the roots of diseased plants the mycelium of a fungus has been found which probably may be the cause of the malady. The fungus appears to enter the root hairs of the plant and from thence grows into the main roots and up into the stem. I have not yet proven that this fungus is the cause of the disease but simply mention it as a probable cause. Some plants have been examined in which it was possible to trace the fungus from the roots up into the stem where it gradually disappeared. The rotting of the base of the stem which frequently occurs in blight, is probably caused by the same fungus. The treatment which has been followed to some extent for this malady, but for which no special reason has been assigned is to dig the plants up, prune off the leaves severely, cut off the basal end, and then reset. Plants treated in this way, some growers testify, usually recover, while others say they almost invariably blight again. If the disease is of fungus origin affecting the roots in the manner of the fungus above described, this treatment would have the effect in many cases of cutting out the infected tissue. If the plant was not pruned sufficiently high some of the fungus might remain in the stem end and reinfect the plant. This would explain the different results arrived at by different growers, depending on whether the basal end is cut off low or high. It would probably be beneficial in treating blighted slips of this nature to wash the ends, after pruning, with strong sulphur solution.

LONG LEAF OR SPIKE.

The symptoms of this malady are a stunted, dwarfed habit of the plant, the leaves growing comparatively long, narrow, and stiff, and the plant failing to de-

velop to normal size. The ends of the leaves also frequently wither to some extent. The plants have few roots, but so far as these are formed they appear normal. The disease usually occurs in spots in a field, but isolated plants infected with the disease may often be found. It has been found by repeated observation that the disease is almost invariably produced on plants which are set on shell heaps or where shell is mixed with the soil in any considerable quantity. as is frequently the case along the coast of Florida. It is also common for plants to assume the same characteristic symptoms when they are grown on spots in the field where heavy fires have been made in clearing the land. Plants set too near salt water also contract the malady, as do also those which are accidentally planted over sticks, stumps, etc.

The cause of the malady has not been surely determined but it seems quite probable that it is, at least in many cases, simply a stunted, dwarfed condition of the plant produced by improper conditions. If affected plants are taken up and transplanted they are said to seldom produce good plants. It is well known that when an organism has become run down and worn out it seldom has the power to fully recuperate in a single generation. I think that the remedy for the malady will be largely preventive, that is planting vigorous slips or suckers in soils which are known to be suitable. Heretofore and even yet pineapple growers largely sell all the slips and suckers which are produced without exercising any selection. As long as this policy is continued long leaf or spike will probably be prevalent. The disease occurs very commonly in connection with the pineapple mite or red spider (Stigmaeus sp.) and in such cases, I am inclined to think, is largely due to the damage caused by the insect. In this case if the plant has not become too seriously affected the destruction of the mite would probably result in its recovery. No experiments have thus far been made in treating the red spider, but from results which have been reported by growers it seems that very fine tobacco dust thrown into the apex of the plant prevents their ravages, but whether by killing them or simply rendering the conditions unfavorable has not been determined. This treatment at present would seem to be the most promising of anything that has been proposed. The treatment for pineapple spike, which we would now suggest, is thus simply the discarding of diseased and weakened slips, using only the most vigorous slips and suckers; and in the case of excessive abundance of red spider, the use of fine tobacco dust thrown into the apex of the plant.

RIPLEY SPIKE.

The Ripley Queen, a variety much prized by many growers, is subject to a disease, commonly known as "Ripley Spike." The diseased slips and suckers, which appear perfectly healthy at first, grow vigorously for a time but finally throw out one or two rolled-up thickened leaves from the apex which grow out to considerable length but retain their thickened and rolled-up character. All growth of the plant now ceases and it suckers from below as if it had fruited. In some plantations this disease of the Ripley Queen affects nearly one-third of the plants, thus it becomes a very serious malady if this variety is to be grown. I have not observed a case of the disease on any other variety. It affects both the so-called red and green Ripley, and in exactly the same manner. One intelligent grower

selected suckers from all of his diseased plants and planted them in one plat and in an adjoining plat put out nothing but suckers from Ripley Queen plants which had fruited normally. I personally examined these plats this summer and found that almost all of the suckers produced by the diseased plants in turn contracted the malady; while in the plat planted with suckers of fruiting plants only a very few cases of the disease could be found. It would seem that it is possible to breed the malady out by the selection of slips from fruiting plants, being careful to destroy all suckers produced by diseased plants, or better still, to destroy the plant as soon as it begins to show the disease.

It may be that the disease is simply a tendency of the plant to sport in this manner. This would at least seem a reasonable theory, as it appears possible to breed the disease out.

OTHER DISEASES.

Among the insects which infect the pineapple in Florida the red spider or pineapple mite (Stigmaeus sp.), the leaf spot scale (Diaspis brumeliae), and the mealy bug (Dactylopius), are probably the most serious. As the work on these diseases belongs in a different Division of the Department of Agriculture, we have given but little attention to them. As mentioned above, however, for the red spider treatment with very fine tobacco dust thrown into the apex of the plant seems to have given the best results. For the two latter the resin wash has been used with fair results.

There are many other diseases of the pineapple but we have not the time and space to consider them here. Those which have been mentioned are the only ones which at the present time appear to be serious in Florida.

DISCUSSION.

(The following discussion followed the reading of Prof. Webber's paper).

Geo. H. Wright: Do you find any trouble with the mealy bug?

Prof. Webber: The mealy bug is found in almost every pineapple plantation in Florida, but is seldom present in sufficient numbers to cause serious damage. If it should become very abundant and injurious, I think it would be a difficult problem to find an effective treatment, because the insect is located under the leaves at the base of the fruit, in the eyes of the fruit, and on the roots, stem, and bases of the leaves under the ground, places very difficult to reach with sprays. They are very easily killed if one can reach them, the resin wash and kerosene emulsion being effective sprays, in this case and fumigation with hydrocyanic acid gas also an effective treatment. One method of treatment will probably be to fumigate or immerse the slips in the spray and then plant them on new uninfected fields.

INJURIOUS INSECTS OF THE YEAR.

Paper prepared and read by Prof. P. H. Rolfs, of the State Experiment Station, Lake City, Columbia county, Chairman of the Standing Committee on Entomology.

[SEE MINUTES PAGES 1 TO 6, ITEM 60.]

Within the last year a great many insects have been sent to the Experiment Station from different counties in the State. While many of the inquiries have merely been to find out the names of these insects and to be sure that they were not destructive species, frequently specimens of destructive species came to the office.

SAN JOSE SCALE (*Aspidiotus perniciosus*).

The most destructive insect that has been found in a new locality is the San Jose scale. Specimens of this were sent from Orlando, Florida, and upon investigation it was found that the local center of the dissemination was located at that city. While the number of trees examined and found to be infested was not very great, enough was found to satisfy me that this insect will be exceedingly severe in that locality. I feel warranted in stating that it will be much more destructive to the pear and peach crop in the Peen-to belt, than it is in the north. Observations indicate that where young peach trees become infested, they will not be able to survive more than two years. While in the northern sections of the State it takes about five years for this insect to destroy a peach orchard. We see, therefore, that it is of the highest importance to see to it that this insect does not get a foot-hold in this particular section of the State.

The work done by the fruit growers of De Funiak and the Experiment Station have proven that this insect can be controlled by the use of resin wash, and at the same time peach growing will not be made a losing business. One point of especial value has been brought out by this work and that is that we must not treat our trees to the stronger resin wash during the winter months, and that we may use this wash in quite a concentrated form during summer.

I have been surprised repeatedly by the greater resisting power that our trees have during summer, than the peach trees have in the North. I think that this can be explained by the fact that our trees produce matured wood by the first of October or even a little earlier, and although they are in full foliage they are in quite dormant condition as far as growth is concerned, and consequently are able to withstand a stronger insecticide than the trees in the far north. However, it does not always follow that old leaves are more resisting to caustic insecticides than new ones, in fact, this has been proven to be quite the contrary in several instances.

About November, 1894, the orchard of A. P. Jones, De Funiak Springs, Fla., containing seven acres was sprayed with resin wash. In the forenoon the normal strength was used, in the afternoon the strength of the insecticide was increased slightly; the results of this increased strength was that nearly all the fruit buds had been de-

stroyed, and rendered the trees fruitless during the summer of '95, but where the normal strength was simply used a considerable fruit had set and matured. The accuracy of this statement can not be doubted as the work was done under the direction of Mr. G. E. Mellish, and the very row to which the work had progressed in the forenoon was indicated by the presence of fruit, while that where the afternoon work was begun, and the increased strength was used was marked by the absence of fruit. From the work that has been done on the San Jose Scale at De Funiak we may condense the following statements, First—the work of spraying with resin wash to control the San Jose scale is profitable in a peach orchard. 2nd.—that the heavier strength of winter wash should not be used during the winter time, but a weaker solution should be used. 3rd.—that the stronger winter wash may be used up to the middle of October. 4th.—that the only difference between the winter resin wash and the summer resin wash, is that the former is more concentrated, consequently, we have no occasion for two formulas. All that is necessary is to indicate the number of gallons to which the compound should be diluted for summer and winter washes.

SUGAR CANE MEALY BUG (*Dactylopius calceolaria.*)

Owners of groves who have had anything to do with the mealy-bug of the orange, know what a severe pest it is to combat. In fact, it seems almost impossible to eradicate it when once established. We have now imported to our State a second species of mealy-bug. It was brought from Jamaica on sugar cane and has become somewhat disseminated. This insect lodges itself between the leaf-sheath and the stem, making it almost impossible to reach it with insecticides. To free seed-cane of this insect, it is necessary to strip the leaves off completely and wash the stalk with some strong insecticide.

This insect will become very severe in the cane fields of the South, unless proper precautions are observed to keep it in bounds. It is already a severe pest in some green houses of the North, consequently, there is danger of infection from this source. Some agriculturist or horticulturist may bring this pest to his premise by simply bringing a few ornaments from an infested green house.

From my own experience with mealy-bugs, I am inclined to believe that it is almost impossible to eradicate the insect when once firmly established, without the total destruction of the plants infested. If any one should unfortunately receive plants or fruit containing mealy-bugs, he will render a service to himself and neighbors to destroy the whole, fruit, insects and wrappings at once.

The mealy-bug that infests our orange trees and also many ornamentals is *Dactylopius citri* (destructor).

SUGAR CANE BORER (*Chilo saccharalis*).

The larvae of this moth have become quite destructive in several cane fields of Florida, and it is one of these insects that the sugar cane grower needs to fear. While there is no danger of it spreading with great rapidity, it is very difficult to combat and keep within bounds. It is the larva of this moth that does the damage to the cane. The eggs are laid upon the body of the stalk of cane and as soon as the larvae hatch, they begin to bore into the body of the sugar cane. The opening in which they enter is so small that it is quite difficult to detect, and it is necessary to strip the leaves off to find the

openings at all. The insects then make a burrow in different directions through the body of the sugar cane, causing great damage in their course. After feeding about thirty days in the body of the sugar cane, the larvae transform into pupae. In this state they come near the surface of the sugar cane stalk so they may emerge as soon as the chrysalis state is over. They remain in the pupa state for about fourteen days, when the insects emerge as full grown moths. The moth is about an inch long, and of a dark gray color. Without any particular markings, it is very hard to detect it on the cane leaves. Very soon after the moth emerges it is ready to lay eggs for another brood of insects. As it requires only about eight or ten days for the eggs to hatch, we have a complete life cycle in less than two months. At the Experiment Station moths emerged from the pupae during February. As these were kept in practically an out door temperature, it was about the same time that it would occur in the field. At this rate we would have nearly or quite four broods during the year in Florida, and very little reflection will indicate to us the great amount of damage that the progeny of a single insect can do in one year.

This insect has long been known to be very destructive to sugar cane in the West Indies and South America, and while it is known to exist in a large portion of the South, it will be disadvantageous to disseminate it throughout Florida. While we are not practically a sugar producing State, a great deal of it is produced for home use and in the local markets a great deal of cane syrup is sold, so it would be a serious disadvantage to have the pest generally disseminated.

The methods of repression are not easily applied; it is almost impossible to destroy the moths or eggs, and to attempt to dislodge them would be to destroy the cane field. About the only practical remedy that can be suggested is to destroy all the refuse cane, including tops and stumps that are left in the field. These should either be burned or buried deeply. Simply plowing them under could not be considered deep enough. The greatest care must be taken in selecting cane for seed, as the burrows which the larva makes are very difficult to detect, and it would not be safe at all to use cane for seed from fields that are known to be infested. Of course insects that are in the cane which is crushed, will be destroyed, consequently, there is no occasion for destroying the leavings from the cane mill. In planting cane I would advise everybody to be exceedingly careful in selecting any seed and to reject all that came directly or indirectly from the West Indies, unless they are absolutely certain that this cane is free from borers.

MEXICO COTTON BOLL WEEVIL (*Anthonomus grandis, Boh*).

In Mexico this insect has been known for years. While it has long been known to entomologists and has done much damage there to cotton plants, it did not occur in this country until 1893. This insect works upon the boll much as the Curculio works upon the peach. The eggs are deposited upon the side of the boll and when they hatch the larvae enter the boll. Every section of the boll that is entered is completely destroyed, even if just one insect is found within. Often several insects are found within a single boll. The origin and distribution of this insect has been worked out by the Division of Entomology, U. S. Department of Agriculture. In 1893 this insect crossed the Rio Grande river at

Brownsville, and from there has been greatly disseminated northward until last year it occurred as far north as San Antonia, Texas.

As early as 1862 cotton culture had to be abandoned in Nonclova, Mexico. It is said that its cultivation was attempted in this district two or three years ago, but the weevil again appeared and destroyed the crop. While this cotton boll weevil may not be of specific interest to the horticulturist, it is still of interest in that it indicates with what rapidity the insect will spread when it is introduced in the country. Under natural conditions this insect would have been longer in going across this watery barrier, but the commercial interchange between these places soon obtained passage for the insect into the United States.

The remedies that have thus far been put into use are about as cumbersome as the remedies used to combat the cotton boll worm.

A BRIEF STUDY IN INSECT DISSEMINATION.

Paper prepared and read by Prof. P H. Rolfs, of the State Experiment Station, Lake City, Columbia county, Chairman of the Standing Committee on Entomology.

SEE MINUTES PAGES 1 TO 6, ITEM 60.]

The most destructive insects to the grove and farm crops of Florida are the scale insects; of these there are about 140 species known to live in the United States. Thirty of these have "been introduced through human agency." The most destructive that fruit growers have to deal with are among the imported species. This is true of other insects as well as the scale insects. The reason for this is quite plain. The number introduced at one time is usually small and located on nursery stock, hence the parasites of these have not found them or if parasitized, the parasites emerging are liable to become bewildered in their new surroundings and lose sight of their host altogether. Without going further into the cause of the absence of parasites, I may state it is as an accepted fact that our most destructive imported pests have comparatively few parasites and that their unusual multiplication is due to their being introduced to disease free and otherwise favorable environment.

I will name a few imported insects that have won more than a local reputation. In New England and Middle States is the imported elm leaf beetle, *Galerucella luteola*. This is spreading with an alarming rapidity and threatens to devastate the famous elms of many a lovely eastern city. The gipsy moth has spread over an area not as large as the smallest county of Florida, and the state of Massachusetts has spent over a half million dollars already to effect its eradication. The legislature is now considering an appropriation of $200,000 to continue the work as it is begun. Our sister state, California has spent over a million dollars in trying to get rid of a single species without avail; I refer to the fluted scale, *Icerya purchasi*. Her nurseries have disseminated the San Jose scale to all fruit growing sections causing heavy losses to many states

and minor losses to Georgia and Florida. The West Indies have contributed one scale insect, *Diaspis amygdali* (*lanatus*), at least to the fauna of Florida. This insect is as hard to eradicate as the San Jose scale, but fortunately it has not been disseminated very extensively. Recently I have received specimens of *Dactylopius calceloria*, mealy bug of sugar cane, destructive in Jamaica and at the same time some specimens of sugar cane borer, *Chilo saccharalis*. This insect is from the West Indies. Already have we reports that cane fields have been rendered entirely worthless by the action of the last named.

To recapitulate,—Europe has contributed four very destructive pests to our fauna; Australia one; South America one and West Indies three.

None of our industries are so exceedingly remunerative that we can afford to invite wholesale loss with the idea of cutting down production and thereby limiting the supply. It is not necessary for a pest to eat up a whole crop in order that we may destroy an industry. The margin of profit is usually very narrow and the shrinkage of ten per cent often turns the balance from profit to loss.

You ask me if there are any destructive insects in the countries outside of the United States that have not been imported? I will say that there are 130 species of scale insects in Central and South America and the West Indies that have never been found in the United States. *Aspidiotus articulatus* and *Aspidiotus scutiformis* are both destructive to the citrus plants, the former in the West Indies, and the latter in Mexico.

Many of these insects simply await the introduction to this country to become serious pests. We can not rely upon climate as a boundary to their progress. For example; the mealy bug of the West Indies is already firmly established in Florida and infests many green houses of the North. *Diaspis amygdali* (*lanatus*) a West Indian species is widely disseminated in Florida and infests peach trees as far north as Washington, D. C. The cotton boll weevil of Mexico is making an alarming march northward into middle Texas. We can not tell therefore, whether a particular species will be limited to a particular climatic zone, until it has been tested and then it will be too late to check its ravages.

ADVANCEMENTS MADE IN INSECTICIDES.

Paper prepared and read by Prof. P H Rolfs, of Lake City, Columbia county, Chairman of the Standing Committee on Entomology.

[SEE MINUTES PAGES 1 TO 6, ITEM 60.]

The decided success obtained from combatting the Colorado beetle with arsenic gave a heavy impetus to the methods of combatting destructive insects. A great many different substances have been tried with varying success. Many of these materials are of no value whatever, from an economic standpoint. The idea of using a liquid solution for combatting these enemies of farm crops is very firmly grounded in the mind of the Agriculturist. By far the greater number of experiments are made in this particular line, consequently, we find the greatest amount of advancement along this line of study.

Among the late improvements for combatting leaf eating insects is the change in the form of arsenic used. This has been brought out prominently by Prof. Fernald, Entomologist of the Massachusetts Experiment Station. It was found that by using arsenate of lead, instead of using Paris green or London purple, that a greater amount of poison could be used without proving caustic to the trees. That is, the arsenate of lead would prove less caustic to the foliage of plants than the other forms of arsenic. Prof. Fernald described the process of making the arsenate of lead in the following way, "place eleven ounces of acetate of lead, and four ounces of arsenate of soda in a hogshead containing 150 gallons of water. This substance will dissolve quickly and form an arsenate of lead in the form of a white powder which remains in suspension," or we may use twenty-seven per cent of arsenate of soda and seventy-three per cent of acetate of lead by weight. Dissolve these saparately and they may then be mixed and the arsenate of lead will be precipitated. The strength of this mixture may be increased so as to use 22 ounces of arsenate of lead and four ounces of acetate of soda to 150 gallons of water. Care should be taken to use a sufficient amount of acetate of lead to use up all the arsenate of soda as the arsenate of soda is caustic. This substance will prove quite valuable to vegetable growers of Florida. It has the advantage of being nearly colorless, consequently, not specking the fruit or vegetables. Frequent analyses indicate that the danger of poisoning from arsenate by eating fruit that has been sprayed with them, is very little indeed. Of course this insecticide will not prove valuable against the various scale insects and all such pests that feed below the epidermis.

ADVANCEMENT IN MACHINES.

Comparatively speaking Florida has no doubt, more spraying machinery in the field than any other state. Many of our orange growers do not hesitate in saying

that a spraying machine is as necessary as a fertilizer, and many vegetable growers are equally or even more emphatic in their assertions, but even with the long list of spraying machines that we have, New York is ahead of us in the elaboration of machinery for this work. Almost without exception, all machines in Florida are run by hand. In New York city where the imported elm leaf beetle is very destructive to shade trees, much more powerful machinery has to be used. Consequently, powerful machinery has been prepared and run by steam power. In other places there are machines that are run by steam power. At West Point on the grounds belonging to the Military Academy, a fire engine has been transformed into a spraying machine This machine also is run by steam power. In the case of New York city the liquid has to be thrown to a height that can scarcely be attained by hand power.

A VISIT TO THE GYPSY MOTH COMMISSION.

Paper prepared and read by Prof. P. H Rolfs, of the State Experiment Station, Lake City, Columbia county, Chairman of the Standing Committee on Entomology.

[SEE MINUTES PAGES 1 TO 6, ITEM 60.]

Members of the Horticultural Society are doubtless acquainted with the fact that more than fifteen years ago this Gypsy Moth was imported from France to Massachusetts, and escaped from confinement. Very little attention was paid to the insect for a number of years because its ravages were confined to so small an area, but finally the insects became disseminated from one estate to another until finally a whole township and then a county was over run with them, while in its home, France, the insect attracted but little attention and is not considered bad; it has become so serious a pest in Massachusetts that it not only threatens the destruction of forests but also cultivated crops. Some of the district throughout which this insect has been distributed is forest land and only held in reserve. Consequently it is not sufficient to eradicate it from the cultivated fields. The district over which this insect is disseminated is fifty miles long and a few miles wide.

Probably the most seriously infested place is near Malden, at which place this Moth Commission has its headquarters. Upon visiting this place I met Mr. Forbush and his assistants, who gave me all the information I desired, and also made me acquainted with the different methods used in combatting this insect.

EQUIPMENT.

A great many different methods for combatting this insect have been tried; the first that came to mind was spraying. However, to treat so large an area completely and to consider the great number of hiding places that this insect has, it became apparent that this could not be used as a means of eradicating the pest. However, where the insect was abundant enough to threaten the death of trees and shrubs, this had to be resorted to for temporary relief. Two forms of insecticides were used: those that kill by contact and those that kill by poisoning. Of these the latter was found

to be the most important, and by later investigation it was discovered that arsenate of lead gave better results than any other forms of arsenic. Many of the trees were exceedingly valuable and at the same time very large, so it was necessary to use a very strong spraying machine and a large force of men to work it. The force used was man power. I saw no machine that was run by steam power in this place. In cases where the trees were exceedingly valuable and severely infected they proceeded in somewhat the following manner;—The trees were thoroughly sprayed to begin with to kill as many of the larvae as possible, and after that men provided with telegraph climbers worked their way all over the large limbs of the tree, scrubbing them down thoroughly with the wash, to kill off all the insects and nests of eggs that were found. At the same time all the limbs in the trees that could possibly be spared were removed and burned. After a time it was discovered that in removing the egg masses a portion of the eggs would fall to the ground to hatch, and the insects would crawl up the trees to continue their devastation. Consequently a second insecticide was used. This is an exceedingly caustic preparation and when applied to the egg mass it kills quickly, and the eggs are allowed to remain where the female deposited them.

As soon as the larvae have become full grown they descend the tree, either to the ground or to some hiding place on the tree, as cracks and hollow places, and there pupate. These larvae often congregate to the number of several hundreds in the crotches of the tree. After emerging from the chrysalis state the females ascend the trees to deposit their eggs. The destruction of the larvae can not be complete, so it is always necessary to go over the ground after the larvae have pupated to destroy the pupae. As has been mentioned before these occur among rubbish, under boards, in tin cans or anything that will afford a dark hiding place. Old stone fences, which are very common in this district, are favorite hiding places. To combat this insect in this stage a kerosene machine was made; the essential parts of which are a large tank to hold five or ten gallons of kerosene and hoses leading from this to supply nozzles with kerosene. The nozzles are simply long iron pipes with asbestos wrapped about the distal end. Kerosene is discharged on the asbestos and ignited. With these large torches much effective work can be done, but it is impossible to kill all of them where they have crawled into a wide stone fence. The only remedy in such a case is to tear the fence actually down. At the proper time of the year the forest area is burned over, and in this way many insects are destroyed.

EMPLOYEES.

Professor Fernald, Entomologist of the Massachusetts Experiment Station, is at the head of the Commission. Besides him they have employed five or six assistant entomologists, and Mr. Forbush is Director of the Field Work. The work of the entomologist consists mainly of working over material and preparing information. Very close scientific study is being made of the methods of dissemination and general life history of the insect. While at first sight this seems to be rather superfluous in view of the fact that the life history of this moth is pretty thoroughly known to entomologists, but these men are by all odds the most important agents in directing the work properly. For example, it has long been known that these insects would spring

up spontaneously. This was thought to be so as no material was being carried from one district to another, and all people in the infected district were very careful not to aid in the dissemination of the pest. Later it was discovered that the eggs of this insect were eaten by various species of birds but were not digested.

SCOUTS.

Besides the entomologists there are men employed who are known as scouts. These are such men as are entirely familiar with the ordinary work of the farm, and who have had a fairly good education and are quick observers, but who have not had the advantages of a college training. As soon as these men are trained to know the insect, eggs, larva and pupa, they make excellent field hands to use in making observations on this pest. These men are employed to traverse the district in the same way as field geologists, except that they cover the field much more thoroughly. These scouts bring in all the insects captured, and mark the spot where the insect was taken. A special code is used for marking these places so the people connected with this work are able to tell just what stage the insect was taken, and from what place and at what time. A record of this is also made in the field book. The report is then filed in the office; so that every place where the insect has been found can be again found and worked over when it is desirable. The report of every scout is so perfect that the exact location, whether it was two years before or later, can be found by the employees of the Commission without unnecessary delay.

LABORERS.

The laborers are men who are hired to perform such work as requires no especial fitness, such as pumping the spraying machine, tearing down fences, etc.

RESULTS OF THE WORK.

The money at the command of the Gypsy Moth Commission was not sufficient to warrant an attempt at the destruction of the insect as a whole, consequently it was necessary to attack it in certain localities, and if possible to get it surrounded so as to keep it from spreading. This seems to have been effective, as no new outbreak has been reported for some time. In some places where the insect was formerly severe no insects were found last year, so while the work is not as yet complete, there is no doubt as to the ultimate end if the state will simply persevere in pushing the work forward. It seems like a gigantic undertaking to search over so large an area and try and find all the insects and eggs by simply looking for them. However, that is about what it has resolved itself into. Now this work may seem like a very clumsy undertaking, yet in all the important centers and important shade trees the insect has nearly or quite been destroyed, and these have put out new growth and are better shade trees than the year before. Cultivated crops are no longer threatened.

RESULTS IF THE WORK HAD NOT BEEN DONE.

Just what the results would have been had no work been done can be easily foretold. The repeated attempts by private parties to subdue the pest in their own fields proved entirely unsatisfactory, inasmuch as their premises would soon be stocked from their neighbors' fields. The effects upon the forests were also becoming painfully apparent; the trees defoliated in spring and early summer sent out new growth in early fall that was killed by early frosts. It was simply a matter of time until all the hills should become barren. While the parks and lawns could easily be taken care of by their owners, this forest land that scarcely pays taxes would have been devas-

tated, and the bleak winter winds would have supplied the people of the districts with veritable north-west blizzards. In sparsely settled districts like ours people have very little notion of the value of a forest to the country, and we Americans as a whole are absent minded in regard to forest destruction and its influence on climate. We can scarcely understand the high estimation in which shade trees in New England are held. I remember seeing one large elm that was by no means a fine specimen of a tree, inasmuch as the branches were low and each one seemed to have a head of its own, scarcely the shape of a tree, and anything but desirable. Under it stood a very fine house, vauled at from five to seven thousand dollars. The owner of the house had given directions to the chief of the fire department that in case of fire the tree was to be protected at all hazards, and the house saved if possible. If it was a question as to which could be saved the house was not to be taken into consideration. Now this was not mere idle talk on the part of the owner of the property. These orders would be carried out in case of fire. In other words, we may say that this tree was valued at five thousand dollars, and no doubt but that the removal of this tree would depreciate the selling price of that property several thousand dollars.

LEGISLATION AGAINST FRUIT PESTS.

Discussion under topic "Entomology."

[SEE MINUTES PAGES 1 TO 6, ITEM 61.]

Prof. P. H. Rolfs: There is one thing which ought to come before the Horticultural Society, and that is the matter of insect legislation, no matter what our position is on this question, whether we favor it or not. The states one after another, until 29 states, have already got laws against certain pests, either vegetable or animal pests, and there are some others I have not included in this enumeration. Thirteen of these states have amended or passed laws since 1890. You remember in the last legislature there was a bill introduced in regard to this. I have heard, and it has been asserted that it would be continued at the next meeting. What we should look after is to have the best law possible, that is the one that is least hurtful, or the most judicious law.

President Adams: Speaking of legislation, you will recollect, that there was a bill on this subject before the last legislature. At one of our evening sessions it was considered at considerable length, and many provisions of the law were considered injudicious. Your President was instructed to go to Tallahassee and consult with the Committee having the bill in charge. I went directly from here to Tallahassee in obedience to your instructions, and was received by the Committee having the bill in charge in the most friendly manner. The committee showed every disposition to accede to the requests of the State Horticultural Society, and expressed their gratification at the interest we had taken in the matter. I had two or three conferences with this Committee, and they showed a perfect willingness to change the bill and incorporate the suggestions we made, ex-

cept in such cases as the Committee feared might endanger the passage of the bill. These exceptions were mainly where any expense might be incurred by the State. The Committee feared that any provision that would cost the State a dollar would be promptly killed. This Committee was earnestly in favor of the bill and did not want to make any changes to endanger its passage. We finally put it in a shape that appeared to them to be such that they could get it through the legislature, and it appeared not to be so cumbersome as to be impossible of execution, and drastic enough to make it protect and still not endanger the property of the horticulturists. After getting the bill in that shape I left, with the expectation expressed by the Committee that they would secure its passage, but we know they failed. I agree with the Professor, that any legislation of that kind can only be efficiently done under the counsel of such men as Prof. Rolfs and other practical horticulturists who not only understand the danger as far as insects are concerned, but also the danger of drastic action which might result in injury to the property of horticulturists. That was the principal danger that we felt was embodied in the bill then before the legislature. We saw that the agencies through which it was to be operated were necessarily incompetent to judge what should be done to eradicate insect pests. I fully endorse what the Professor has said as to the necessity of great caution in the preparation of this bill. It would be very easy indeed to draft a bill that would be more dangerous than the insects it is intended to control.

Prof. Rolfs: I would like to give one illustration that has occurred since the last meeting. A certain tree disseminator has bought trees from other states at the lowest price he could buy them, imported trees with the scale on them and disseminated them through a certain district and sold them to people, and they knew they had the insect on them. You see these people who are buying from men who are selling such nursery stock cause the original orchard to become infected, and how irritating it is to a man, who has a nice orchard to have the pest introduced in that way.

A. W. Stewart: I am glad Prof. Rolfs has brought this thing up. That is a thing we have to guard against. I am well acquainted with the circumstance which he speaks of. That is actually the case. Men in sections perfectly free of the San Jose scale have bought only a few trees and those trees have spread the scale all over. I believe I met Mr. Rolfs in an orchard where he first saw this scale in the State. I was there examining it, and we cut off some of the limbs which he took home to investigate. But since that thousands of trees right from that same nursery have come into this State and been sold. A man has a nice orchard, it is a big loss to him to have that brought in, yet what can you do with it; we have no law to punish a man, and I should be glad to have a law framed that will protect us. The first of that scale was introduced from California. I got it. When I saw it I dug it up and burned it at once. I only got two trees from Capt. Patterson, who imported some direct from California. The next I saw of it was when Mr. Rolfs and I met in the orchard. Now you can trace it; there is scarcely an orchard that is not infected more or less, but they are taking measures to stamp it out. But how can you do it, if men are allowed to bring those trees in faster than we can stamp it out? That is the reason I am in favor of such a law. I see a great many of

the states have passed laws. It is time we should be doing something. When the bill came up before the legislature I was in hopes it would pass, and I am in hopes before we adjourn we will take some action to appoint a committee to work with the legislature and see if we can not get some legislation adopted.

DISEASES OF THE TOMATO.

Discussion under topic "Vegetables."

[SEE MINUTES PAGES 1 TO 6, ITEM 42.]

L. Cameron: There is a disease that attacked the tomato plant, especially in this county, (Duval), last year; it is a sort of fungoid growth on the plants that blackens the stems and curls up the leaves. This year it appeared in Brevard county. They have tried several insecticides; a solution of copper has been found to be the best. I can not say what the disease is. I had several specimens sent me of dead leaves, and I would like to know if any gentleman present knows anything about it.

Prof. P. H. Rolfs: It is difficult to say without specimens.

Mr. Cameron: I have some specimens from Brevard county, and several wrote me about the plants, and asked me what they could do. They tried a great many different kinds of solutions for it, and the one they found best was a solution of copper.

Prof. Rolfs: I will say in regard to the diseases of the tomato that we have four diseases that would come pretty well under your description, and I am at a loss to know which one it is. At present no disease has been reported but what we can control or understand. It is either black rot, or a form of blight. If it is black rot the Bordeaux mixture will be the best thing to use.

Mr. Cameron: The black rot generally affects the stem.

Prof. Rolfs: No it affects the leaves, the leaves curl up, but finally the stem is involved. I would suggest in your case that you send specimens directly to the Experiment Station . In all cases of the tomato we have those diseases well under hand, there are no longer diseases, which we can not control in a practical manner. I would say in regard to the diseases of the tomato that the black rot is by all odds the most important one to the tomato grower of the State. I think it is now disseminated throughout all tomato fields, and no matter what treatment you may give to the tomatoes, fertilizing, cultivation or otherwise, it will manifest itself and do a sight of damage to the tomato crop, but you can do a great deal of fertilizing properly, putting your crop in proper sanitary condition, and in that way you can neutralize the effect and not need a spray, but if the growing tomatoes have poor land you will at last have to spray with the Bordeaux mixture. Again in regard to mildew, or mold, it is caused by a minute mite resembling the rust mite of the orange; it is not the same species. This can be controlled by the sulphur spray. Some people write me they control it by using the flowers of sulphur, but I got no good results from using it. I

used also the black sulphur, which is said to be better, but I got no decided results from that; I would, therefore, recommend a sulphur spray for controlling that. In regard to blight, that is quite a difficult thing to handle in a practical way; however, it can be done by thoroughly spraying the ground about roots of the tomatoes and the parts of the tomato stem next to the ground. In many tomato fields of the State the grower practices topping to bring the tomatoes in earlier. You can bring in the first tomatoes about two weeks earlier I brought them in 17 days earlier by topping and staking than I could otherwise; that is, the same tomatoes planted from the identical bed. On the other hand you have the disadvantage of producing oedemia which simply means the swelling and distending of the tissues. In the case of topping the root system becomes too strong for the leaf system, the cells of the leaves give way under the immense root pressure, finally the cells break down and the leaf hangs lifeless by the side of the plant. When a case of this kind occurs we should stop topping; possibly root pruning may be necessary; however, in many cases if the grower stops topping this is sufficient to overcome this disease, but if it happens to be a rainy season he may have to resort to root pruning, and this will check the oedemia to a decided extent. You want to cut off the root pressure, cut off the supply of nourishment taken from the soil, and in that way balance the root pressure with the amount the leaves can assimilate.

Another trouble that was mentioned to me about four years ago when I was making extensive studies on these different diseases, is the dropping of the bud; people told me that was the greatest trouble they had in the tomato field. This is really not a disease at all, it occurs on poor land, ill fertilized land and on land where tomatoes are growing rapidly. To overcome this topping may be resorted to. When tomato vines grow very rapidly, the nourishment is sent forward into the leaves. The leaf system flourishes to the disadvantage of the productive system. If you disturb the conditions the nourishment will be sent in another direction. This is in the same line that many of the tomato growers are following that is, topping the tomatoes. I have induced both of these diseases artificially, and then turned around and grew them out of it artificially, so I have no difficulty in knowing just what the conditions are for these different diseases of the tomato. We can learn about the tomato in two or three weeks what it takes the orange grower two or three years to learn about his orange tree.

MICROSCOPY IN HORTICULTURE.

Scientific Training not Essential to the Effective use of the Microscope by the Florida Fruit Grower.

Paper prepared by Rev. C J. K. Jones. of DeLand, Fla., and Louisville, Ky., and read by the Secretary.

[SEE MINUTES PAGES 1 TO 6. ITEM 17.]

One of the greatest difficulties under which the farmer and fruit grower labors is the lack of definite knowledge as to the facts and phenomena attending the cultivation of plants and trees. In the orange industry, as conducted in Florida, the writer has found it difficult to get an accurate statement as to the nature of the various conditions under which the culture is conducted. He has heard the strangest reports, from all parts of the State, concerning the character and depredations of various predatory insects. He has been frequently alarmed at descriptions of old, and new diseases, that threaten to destroy our groves. Every exudation of sap has been construed into an infallible sign of foot-rot (mal di goma). In the days of the pruning madness he received the most startling declarations as to the histology and physiology of the orange tree. When it came to the chemistry of the soil; the action of fertilizers; the structure and action of roots; and the relations of leaves to the normal development of the tree, he found that every man was a law unto himself, and tried to be a law to his tree also.

The writer in no wise would even seem to reflect on the intelligence of his fellow horticulturists in Florida. On the contrary, after years of association with them personally, and through their many valuable articles in the horticultural journals, he knows that they are a class of men usually capable in their calling, as pertains to the practical side of fruit growing. The purpose of this article is not to criticise, but to call attention to the fact, that there are many problems in fruit raising, which require a method of solution more scientific in manner of investigation and treatment, than we have hitherto given them. When we shall have adopted this more scientific proceedure in experimentation, and in observation, we shall arrive at more scientific, and therefore more certain results. This is not to intimate, much less to say, that there are not among us, men who are scientific. There are many such men, members of this Society. But the larger number of us horticulturists are not scientific in our methods of horticulture.

Am I in error when I say, that in our several communities truly scientific horticulturists are in the minority? The lack of scientifc method has been much impressed upon the writer during the past fifteen months, as he has closely followed the many discussions on the condition of our frozen-down groves, and the best course to be pursued in order to resuscitate them. The great variance in the counsels offered has been due to the absence of an accurate scientific knowledge of the status of the

groves. Men who were most successful orange growers, when the conditions were normal, have been sadly "at sea" for the past year. Some have not yet come "within sight of land." Perhaps we are each, and all, somewhat to blame for this situation of uncertainty, in that, in the past, we have not insisted upon scientific methods for ourselves, and for our neighbors. They who knew should have imparted to those who did not know.

While on a visit to his grove in July, 1895, the writer asked several most successful growers, "have you used a microtome and microscope on these blighted and diseased tissues?" The answer was, "No." Perhaps at that stage of affairs sections of wood would not have revealed much, unless there had been previous studies of normal tissues in bud, bark, wood and root. Nevertheless it would have been instructive to some of us, not on the field, if we could have had a few microscope slides of various tissues made on the first morning after the February freeze. Especially valuable would it have been, if, with the slides of sectioned wood, there had been a short history of culture and fertilization.

The writer saved over two hundred trees, fourteen years old, budded on sweet stock. He attributes this, fortunate "salvage from the wreck," to the fifteen per centum high grade potash in the fertilizer he had used on his grove, which potash made a stronger cellular tissue. In the absence of testimony bearing thereon, he thinks the microscopic examination of tissue would have helped to decide the question.

Prof. Webber has demonstrated to us (see U. S. Dept. Agriculture Year Book, 1894, p. 183 ff) that fertilization has very much to do with the character of the wood and fruit of our trees.

In this connection it is pertinent to remark that we have been greatly dependent on the U. S. Dept. of Agriculture, and its skilled specialists for a large portion of the definite knowledge we have in our calling. I am sure we gratefully acknowledge our debt. But while so recognizing this debt, ought there not to be a deeply felt responsibility, that we shall also do something to help ourselves? We can not all be experts if we would. But we can do something in collecting data that shall be definite and reliable. We can be scientific. As has been said: "It needs no marvelous intellect, no special brilliancy to succeed in a scientific study; work at it ardently and perseveringly, and success will follow." Much of the data that we need must be collected by the microscope. The most of the enemies we have to fight, as the most of the secret processes, and their results, we have need to oberve, are of the "Kingdom of the infinitely little," whereinto the unaided eye of man can not penetrate.

The simple microscope, in the form a single lens, magnifying ten or twelve diameters, is of great service. But to ascertain the facts concerning many an insect and fungus we may require a magnification of one hundred or more diameters. For this work a compound microscope is absolutely essential. For example the study of rusts on grain, the mildews on grasses, the smut of corn; in short the many diseases of field and garden crops, can be intelligently observed only by the use of the complete compound microscope. It was not until men commenced to use this instrument, that the diseases of plants began to be understood and received their first checks. Today the intelligent use of the microscope

combined with some chemical knowledge, is enabling horticulturists, the world over, to successfully cope with their enemies of air and earth, in form of insects, fungi and bacteria. The use of the microscope is, by many, looked upon as requiring such stores of knowledge and such expert skill, that they are deterred from making even a beginning of its use. It is true that the highest expert use of the microscope requires a large amount of technical knowledge. But the data we require in much of our work, does not call for more ability and skill than is easily commanded by the majority of horticulturists, who will give a few hours each week to study and work with the microscope. If we older men, burdened with "the toil and moil," can not find either the mood, or the time, then let the work be done by some of the bright and capable young men and young women of our homes. They will grow into the work and will like it. It would be a practical step in the right direction, if, at our succeeding meetings, we could have a working session with the microscope; at which the value of the instrument could be demonstrated. Such a session would make it very plain, that by the aid of a half dozen microscopes, or even one microscope in each one of our horticultural centers, intelligently used, we could answer for ourselves many questions, which we now send to Prof. Webber, or to Lake City Experiment Station, or to Washington. We can be, we must be, more largely "the arbiters of our own fate." He, who understands aright the practical use of the microscope, as has been said, "is endowed with a sixth sense." For us horticulturists, the one point of especial value in the use of the microscope in our calling, is that we shall make clear and definite to our minds whatever scientific information we may acquire. So important is this subject, that the writer begs leave to suggest, that at least each horticultural neighborhood shall have a microscope and its proper outfit.

We ought to be in position to, at least, make verifications for ourselves, of the facts and principles of our science. Such verifications would be the identification of all forms and effects of insect life which make hosts of our trees and plants. Again, we would gain a practical knowledge of the fungi and bacteria, which plays so important a role in the conditions of health and disease in our plants and trees. At first our studies will be unsatisfactory in immediate results. We shall find it slow work, and not be able to declare the nature and meaning of most that we observe. However, continued observation and study will eventually bring experience, and experience will inevitably result in intelligence and definite knowledge.

To aid any would-be learner of the more scientific aspects of agriculture and horticulture, the writer has prepared, as an appendix to this article, a description of a microscope outfit suitable for a beginner, and for all ordinary uses. There also accompanies this paper a bibliography of some of the most valuable and modern books pertaining to the science of our calling.

In conclusion allow me to say, that what I have urged in regard to horticulture applies equally to agriculture in every particular. The intelligent man who crops his land by the knowledge and methods which scientific men have demonstrated to be successful, is the man, who will realize that "seed-time and harvest shall not fail."

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Agriculture. (U. S. Dept. of) The following titles have been kindly furnished by Prof. A. C. True, Washington, D. C., Director of Experiment Stations. "Fertilization of the Soil, as Affecting the Orange in Health and Disease." H. J. Webber, U. S. Dept. Agriculture Year Book, 1894, p. 183 ff. "Insect Enemies of Citrus Fruits," H. G. Hubbard, U. S. Dept. Agriculture. Division Entomology. "Some Scale Insects of the Orange," L. O. Howard, U. S. Dept. Agriculture, Year Book, 1894, p 262 ff. "Sooty Mold of the Orange," H. J. Webber, U. S. Dept. Agriculture, Division Vegetable Pathology, Circular 15. "Orange Rust. Its Nature and Treatment," A. H. Curtiss, Fla. Experiment Station Bulletin No. 2. "Insects Beneficial and Injurious to the Orange and Other Citrus Fruits." Special Bulletin Louisiana Experiment Station.

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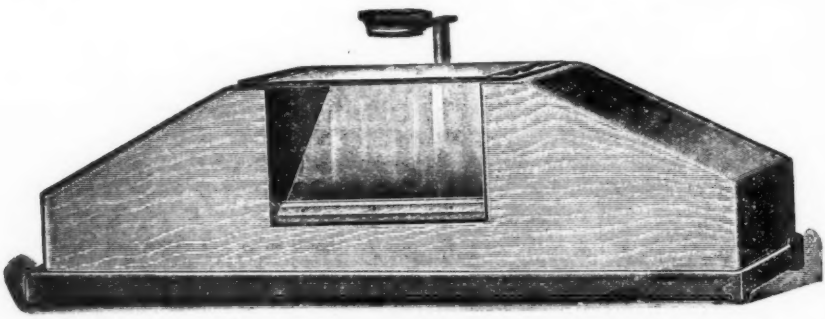
Prof. True, significantly adds the remark "the diseases of oranges have not been reported upon to any considerable extent."

A MICROSCOPE OUTFIT.

In order to aid any person who may desire to inquire concerning a microscope outfit, the following illustrated suggestion is given of such an outfit as the writer deems suitable to the ordinary investigations of an agriculturist or horticulturist.



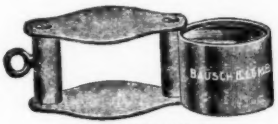
(Cut one-third actual size.)

TT I - IMPROVED BARNES' DISSECTING MICROSCOPE.

The instruments represented are made by the Bausch and Lomb Optical Co., of Rochester, N. Y., and are given below as they appear in the catalogue of this well-known and reliable firm. The writer owns two of their instruments and several of their first-class objectives, with which he has worked for several years, and therefore speaks from experience.

TT I—IMPROVED BARNES' DISSECTING MICROSCOPE, (SEE CUT PAGE 113).

This microscope which costs about $3 will be found very useful for botanical or ordinary zoological work, as it combines all the essentials of a dissecting micro-

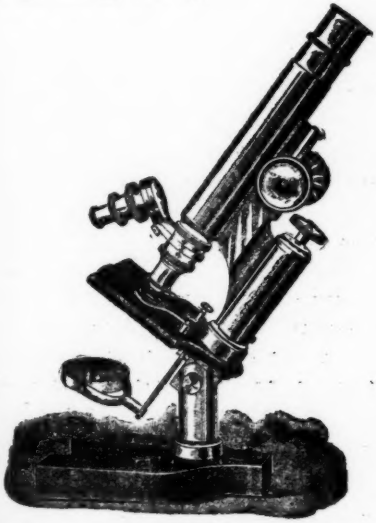


HASTINGS APLANATIC TRIPLET, Nos. 35 to 39

scope, viz.: a good lens in a convenient holder with an ample stage, well illuminated; the whole on a firm base with immovable rests for the hands.

HASTINGS APLANTIC TRIPLET. NOS. 35 TO 39.

For use as a pocket lens, the power 6.7 and 10 are especially recommended, the first, perhaps, superior in general utility, and the second a more convenient size. Nos. 36 and 37 cost $7.



AAB2—CONTINENTAL MICROSCOPE.

CONTINENTAL MICROSCOPE.

This instrument is especially recommended on account of its moderate cost, $42.00.

AMERICAN TYPE MICROSCOPE.

The base is of tripod form and of brass. The bronze pillar is large and provided with

J. S and **JSD**—AMERICAN TYPE MICROSCOPE—UNIVERSAL.

joint for inclination. Coarse adjustment is by diagonal rack and pinion of long range. Fine adjustment is by micrometer screw, head of which is graduated, silvered and provided with indicator. The main tube has two graduated draw-tubes, sliding in cloth-lined main tube. The stage has concentric, revolving motion and clips. The mirrors are plane and concave and of large size, these and substage being adjustable separately on their respective bars, with

NO. 2021 MICROTOME.

circular bearings graduated and silvered This instrument is made in three forms; the price ranging from $72.00 to $170.00.

The writer suggests the purchase of the larger of the two instruments herein named, wherever the purchaser can afford the slight advance in price. The reason for this suggestion is that the larger instrument admits of some accessories for advanced work, not provided for in the smaller instruments.

NO. 2021 MICROTOME.

This instrument is for making sections of wood, stems, leaves, etc. Any good sharp razor ground flat on one side will do as a cutting tool. Razors for the purpose are furnished by the makers of the instrument at a cost of $1.10 and upward.

*FERTILIZERS AND FERTILIZING.

Discussion under topic "Fertilizers."

[SEE MINUTES PAGES 1 TO 6, ITEM 45.]

L. Montgomery: I have no report, and all I can say on Fertilizers is my experience. I have been in the habit of compounding my own fertilizers and making them after a formula I published in the Farmer and Fruit Grower some years ago. I use high grade potash, nitrate of soda, phosphoric acid. Making a fertilizer of about the following analysis: potash 16 per cent, ammonia seven per cent, phosphoric acid four per cent. I am not sure I am giving it correctly as I have not my notes with me. I have been well satisfied with that, and have used it on some of my groves extensively.

C. A. Bacon: I would like to ask Dr. Montgomery about his stable manure. At the last meeting I attended here that question came up and there seemed to be quite a variety of opinion in regard to the use of it for orange culture and other plants. North we stable all our stock, cattle and

*NOTE.—The subject of Fertilizers and Fertilizing, which was passed at the 1896 meeting without further consideration than is given in the discussion which appears under the above head, has been fully covered at previous meetings. For further information on this subject see previous published Annuals of the Society.—The Secretary.

horses both, but here I think the only animal we stable is the horse. I would like to ask Mr. Montgomery what he calls stable manure?

Mr. Montgomery: What we call stable manure is horse manure; we do not stable cattle.

Mr. Bacon: We Northern Yankees call the droppings of both cattle and horses stable manure. I would like to ask if you are satisfied with the results of stable manure, and cattle manure also, and how you apply it?

Mr. Montgomery: I apply stable manure broadcast over the ground, take in a wagon with the hind board out, use a fork and throw it out. I turn it under about once a year and harrow it down level and let it lie. I would do that usually in the month of January, and I am very well satisfied indeed with the result of stable manure. I think if it is out on the ground a little time before you want the plant to appropriate it there is nothing that comes in the way of a vegetable or orange tree fertilizer that is superior to it. So far as the analysis of stable manure is concerned it is very low, any chemist if well informed will tell you that it is the bacteria that produces the principal fertilizer property. You can not get anything like a correct idea of the value of stable manure by analysis before it is put in the ground. Linseed meal analysis is low, but the fertilizing property is high. I had nice fruit on a grove sodded with Bermuda grass. I applied stable manure as a top dressing. I had one grove I fertilized that way all the time, used no other fertilizer until after the first freeze when I put on a good coating of high grade potash manure, as above described.

A member: Wasn't it the Bermuda grass turned under that did good to the trees?

L. Montgomery: It undoubtedly was a decided benefit. For a bearing grove I like Bermuda grass in it, for a young grove it wont do.

A member: I keep my cows in the barn the same as in the North, and that fertilizer is taken up every morning and put in piles, and when I am able to use it I put one-fourth muck with this stable manure. I was getting off of my trees at the time of the freeze 6 to 7,000 boxes—trees 30 feet high, loaded to the ground, in many of the rows we were compelled to carry the fruit out, we could not drive teams in—and nothing but stable manure from my cattle and horses, all put together and mixed with muck. The poultry was kept by itself.

A. W. Stewart: I think there is not enough attention paid to saving manure. My rule is, instead of using muck afterwards, I throw some muck in the stable after it is cleaned out; it is mixed up to a certain degree. When you clean it out you thoroughly mix it up. You want to watch after you put it in, if your pile of manure heats it drives out the ammonia. If you put this muck in after you clean out your stables it prevents a great deal of the heating and you save a large per cent. that would be lost. Let that manure be thoroughly decomposed before you put it on the ground, or else spread it broadcast. There is no use in buying one-half of the fertilizer that is bought, if you will take pains. Every head of cattle I have goes into the stable; every dollar saved in that place I consider clear gain to me. If I have stock running in the woods fertilizing some one's else plants, the stock is doing me no good, I want the stock at home.

In regard to other kinds of fertilizer you might say, we spend a large amount

of money for fertilizer that does us no good. There is not enough attention paid to this. A certain man says a fertilizer is good that like as not he used on a different crop. We want to pay attention to the kind of crop and use fertilizer that it requires. The leguminous plant does not require nitrogen as other plants, and when we supply more than it can consume we are throwing it away. There is where a large part of our profit goes is in buying a commercial fertilizer. We want to save all the fertilizer we can at home.

Mr. Montgomery: My experience justifies the belief that there is no other fertilizer that will so nearly restore the virgin quality of soil as a liberal application of stable manure. This can be benefited nearly 100 per cent by composting with vegetable matter, potash and lime.

CANAIGRE.

"Ad Interim" remarks by Mahlon Gore, of Orlando, Orange county, with discussion following.

[SEE MINUTES ON PAGE 1, ITEM 19.]

Mahlon Gore: Gentlemen of the Florida State Horticultural Society: I suppose many of you, perhaps all, have read something of Canaigre, and have some idea what it is, and what it is used for, and it will not be necessary for me to say anything on that subject.

Mr. R. J. Kerr, of Texas, who is one of the largest growers, and also one of the largest shippers of the wild root, in the United States, was in Florida last December. I made arrangements with him at that time to plant 50 acres in this plant near Orlando. When the car load of root arrived it only was sufficient to plant 42 acres. It has been growing very satisfactorily. The car arrived on the 10th day of January, and the root was planted during the next ten days. It was probably as late as the 20th to the 25th of January before the last of the root was put in the ground, consequenly it has only had a partial season to grow and mature in. Mr. Kerr was here three weeks ago, looked it over, and expressed himself as more than satisfied with the result. He said he was familiar with the plant where growing in its wild state in Mexico, Texas and California, and also where grown in cultivation but for the length of time it had been growing, it was doing better in Florida, and making a better growth of root here than in any other place, showing that much in its favor here. As to the immediate question of producing it he was satisfied. The next question was whether or not the root would carry as large a percentage of Tannic acid when grown in Florida sand as on the heavy soils of the West. I had anticipated that question, and had arranged with Prof. Baker of Rollins College to make an analysis of the root. The specimen furnished him was immature and was really only half grown. I told Mr. Kerr I had made that arrangement and he was anxious to see the analysis. He said "if it will carry ten per cent of tannic acid here, I will be satisfied; if it carries only three I will not be discouraged." We drove to Winter Park, saw Prof. Baker and got his report, showing 13½ per cent. Mr. Kerr says to me, "that settles the

whole question. From this time I am a resident of Florida, I shall transfer my interests from the West and grow Canaigre here on a large scale; I will plant it as fast as I can get the root and have it set out in the ground."

I have in the rear portion of the hall several specimens of the root, and I would be very glad to have the gentlemen see them. (Mr. Gore at this stage stepped to the rear of the room and returned with two samples). Here are two plants—I have a number of others back there. This is from the seed roots last planted, as late as the 20th of January. It is a winter plant; the top dies off and it lays dormant during the summer. These roots will grow very much larger with a longer season.

Question. How would it do to let it remain in the ground two years?

There is always an advantage in harvesting each year as thereby you not only increase your quantity of seed, but you also have your crop for sale.

Question. What is the quality of land best adapted for it so far as you know?

We planted among young orange trees that were frosted and killed down at the time of the freeze a year ago last winter. It was pine land. We have used no fertilizer at all, the plants have only been worked once with a sweep.

Question. After you cut off the end must it be planted immediately or can it be kept?

It will keep until it gets as dry as bone. When put in the ground it lies long enough to get moisture then grows again. It can be taken out of the ground and kept indefinitely. It is not necessary to harvest it when the top dies down, it can be left six months or a year. The bulletin of the New Mexico Agriculture College says, that there in cultivation it yields from 10 to 20 tons of green root to the acre. Mr. Kerr says in the slicing and drying process it dries away about 3½ to one. While in looking over the field we planted for him near Orlando, I asked him what, in his judgment, would be a fair yield for the plants as they were growing there. His reply was, it would not be a fair test to dig it up and weigh the yield now, inasmuch as it had been growing such a short time; if it could have a full year's growth it would be good for 15 tons to the acre.

Question. How about market?

Mr. Kerr says that he will guarantee to buy all that can be raised here, and will pay $5 a ton for the green root.

Question. How was it planted?

We planted under Mr. Kerr's instructions in rows from 30 to 36 inches, and six inches apart in the row, but as it makes so much more thrifty growth here than in the West, he says a foot apart is close enough.

Question. What is its effect upon land?

We have had no experience as to the effect in exhausting the soil. Mr. Kerr says on his plantation in Texas he has grown it for seven seasons without any diminution of the crop.

Question. How did you prepare the ground?

We planted it on ridges, did that under Mr. Kerr's instructions; we ridged up as we would for sweet potatoes. I think we made a mistake. On low, flat ground, which has no natural drainage I think it would do better planted in ridges, but not on land suitable for orange groves. I can hardly answer the question whether it would do better on high or low hammocks; my experience with it has all been on rolling pine land. We find it has made

the best growth on moderately low situations, and on dark soil.

Question. When this plant dries does the acid evaporate?

It does not.

Question. Where can seed root be obtained?

Mr. Kerr will ship more of it to Florida, and I have undertaken as there are a few parties who want it, to supply it, and will fill further orders if desired. By the car load it will cost about $2 a 100 pounds, in small lots $2.25 to $2.50. The freights (I want to say by way of parenthesis) are simply enormous from the far west to Florida. I paid $244 on one car load from Texas to Orlando. I have in my possession a way bill for 2,000 pounds, from the same point to St. Augustine at $1.75 a hundred pounds.

DISCUSSION.

(The discussion given below, followed Mr. Gore's remarks).

Prof. H. P. Rolfs: I would like to make a statement. It has been grown at the Experiment Station at Lake City for two years. It is very sensitive to fertilizer; it won't grow on poor land. I think the Experiment Station has written something in regard to it in Bulletin No. 35. The Canaigre I think will grow in all parts of Florida, but we must remember when 15 tons of vegetable matter are taken from an acre of pine sand there is not much left for the next crop. You must not expect to raise it on a sand hill; it needs fertilizer.

Geo H. Wright: One thing more about Canaigre, its native locality is in an arid, dry country, Arizona, growing wild there. They took it to market from the wild fields, but they found that in cultivating it it made larger crops and paid better. I have seen it growing in New Mexico. Where it was grown by irrigation on a level clay, dry soil, where if they got ½ an inch a year it would be a pretty good rainfall.

*MARKETING ORANGES.

Practical Suggestions on Handling and Shipping.

Paper prepared by J. B. King, of Sanford, Orange county, Chairman of the Standing Committee on Marketing, and read by the Secretary.

[SEE MINUTES PAGES 1 TO 6, ITEM 71.]

Mr. President, Ladies and Gentlemen:

At your last meeting the committee on marketing made no report; presumably, because we had nothing left to market. One John Frost having marketed the greater part of our output at one fell swoop, making us no returns; the transportation companies, and commission men even being left out of the deal. Then comes this same John Frost and robs us of our very trees, budding full of promise for an abundant yield, and leaving us with no present hope of anything to market; and while most of us are still in this unfortunate predicament, as far as citrus fruits are concerned; we hope with the prospects now before us, that in a year or two at most the question of how to successfully market our fruit will again be a live issue with us.

Marketing is the chief end of the whole matter! What use to grow and gather, pack and ship, unless we can profitably market our fruit? At present I will offer only a few suggestions born of past experience, leaving the fuller discussion of so important a matter to abler hands, and some future time.

The first step in the right direction is care; care in picking, care in handling, care in packing, and even careful stenciling of the boxes, for this is the external evidence of the care within.

Have your fruit gathered only when dry, and by careful hands; those who can be trusted to clip and not pull the fruit.

Use baskets and not bags to pick in, as the latter even in careful hands cause bruising and thorning of much fruit; empty in well ventilated picking boxes; do not fill so full that the fruit will be above the level of the boxes. See that these boxes are not roughly handled in transit from the grove to the packing house.

Fruit should be allowed to remain in well ventilated boxes or storage bins, from two to five days, as to the conditions of the weather; in other words, until the fruit shrinks.

This will be facilitated by maintaining as near as possible uniformity of temperature in the packing house, so as to prevent sweating, in which condition fruit should never be packed.

During a large part of our marketing season, we have cool nights and warm days; fruit that is stored in the boxes or bins becomes cold during the night, and about ten o'clock in the morning, the at-

*NOTE—For further and full consideration of the subject of Marketing Oranges see previous published Annuals of the Society.—The Secretary.

mosphere having warmed up, this cold fruit condenses the atmosphere, and we find ourselves packing a lot of wet oranges. I have found a good way to prevent this is to shut the packing house up early in the afternoon, and keep an oil stove burning during cool nights.

Another advantage in holding fruit for several days before packing is that the culls show up better and can be more easily detected.

A good sizer will attend to that part of the business, but the grading and culling should be very carefully done.

Grade uniformly; cull closely, and if you have no home market for culls and wish to ship them, ship only the best and mark them culls that they may sell on their own merits.

Pack honestly, stencil carefully; put your name and address on the box, it is a sign that you are not ashamed of it.

Let it be your aim that when a buyer opens up a box of your fruit he will find it to be just what the stencils said it was; it will pay in the long run. You may fool a man once, but you don't often fool him twice.

Don't pay by the piece, either for picking or packing; it is offering a premium for hasty, careless work and "haste makes waste."

Now the all important question confronts us. How shall we sell our fruit to best advantage? Shall we sell at home? Shall we sell at auction, or shall we ship to the much abused commission merchant? These are questions each grower must answer for himself. Could the orange growers combine on any one feasible plan and stick to it faithfully, it would be much the best for all; but alas! this seems impossible.

If the opportunity offcers to sell at home at anything like a reasonably satisfactory price, do so. "A bird in the hand is worth two in the bush."

If you prefer the auction, a perfectly safe and efficient service is within reach of all.

If you prefer the commission merchant, ship only to those of known reliability and good standing, which can readily be found out from the commercial agencies, or the banks in the cities where they are located.

JOINT MEETING.

Texas and Florida State Horticultural Societies.

Report prepared by G. L. Taber, of Glen St. Mary, Baker County, Chairman Special Committee on Joint Meeting, Texas and Florida State Horticultural Societies, and read by the Secretary.

[SEE MINUTES PAGES 1 TO 6, ITEM 46.]

It will be recalled that, at our Annual Meeting for 1894, a resolution was unanimously passed inviting the Texas State Horticultural Society to join this Society in a Joint Session, to be held during the present year. (1896).

Messrs. Geo. H. Wright, of Orlando, G. W. Mellish, of DeFuniak Springs, and

myself, were appointed as a Special Committee to present this invitation, and to act for this Society in arranging for such joint-session, in the event of the acceptance of the invitation.

At the 1895 Annual Meeting, as chairman of the Joint-Session Committee, I submitted a report, the purport of which was, that the invitation had been personally presented to the Texas Society and had been accepted by that body—which had appointed a committee to act with the committee of this Society in arranging for the proposed event. And, there the matter rested, waiting the joint action of these committees.

Subsequently, and during the summer of 1895, there resulted a voluminous correspondence between the Florida and the Texas Committees.

It soon transpired that a Horticultural exhibit, and convention of the horticulturists of the entire South and Southwest, was contemplated in connection with certain celebrations to be held during the summer of 1896, at Galveston.

The Texas Committee desired that the Joint-Session be held in connection with this Galveston event, in fact, be made a part of it. And it was apparent that it would be impracticable to hold the Joint-Session, except in this connection. In view of this, in a letter to Mr. T. V. Munson, Chairman of the Texas branch of the Committee, dated June 17th, 1895, I said:

"The Florida Society in passing the resolution of invitation, had in view a definite object, namely, getting together the horticulturists of the "Gulf Coast Country," and the Florida committee was constituted to carry into effect this definite object.

The matter at your end has taken such definite (although different) shape, and has been so enlarged in its scope (although upon other lines) that it does not seem to me feasible to carry into effect the original object, but it does seem to me that the meeting you outline, having already taken definite shape, is the meeting that would be most successful under the circumstances, and is the meeting to hold.

But, in order to secure a good general fruit exhibit, the date must necessarily be fixed at a time when Florida (and a considerable portion of the Gulf region proper) could not make an exhibit which would be creditable by comparison, and when such an attendance could not be had as Florida should have as a joint mover in the undertaking.

Therefore, in view of the fact that the Florida Committee is limited by the definite object idea, and the further fact, that, under the circumstances, Florida could not, by reason of restricted attendance and exhibit, participate creditably with Texas as a joint promoter of the undertaking, I do not think Florida should attempt the joint roll, but, that the meeting should be held under the auspices of the Texas Society, Florida participating, like the other states, in response to the invitation of Texas. Texas, and the Texas Committee, which would have the work to do, should have the credit.

Secretary Manville concurs with myself and the Committee in the opinion:

That it is not feasible, under the circumstances, to attempt now to carry out the undertaking on the lines originally laid down.

That a meeting in accordance with the outline and inception you set forth is advisable.

That, in fairness to Florida and justice to Texas, the former recede from the position of joint promoter, and the meeting

be held under the auspices of the latter.

I trust the foregoing will meet with your approval, and that you will take the matter up accordingly."

On July 5th, I again wrote Mr. Munson, urging this view of the matter as follows:

Our Florida Committee appreciates most fully that your Committee wishes to harmonize with us, and we, most certainly, wish to do nothing that should in any way lessen the pleasant relations already established between the Horticultural Societies of Texas and Florida.

And, it was with this in view that I wrote you as I did on the 17th, ult., waiving our claim, for the joint meeting on the lines originally contemplated, so that the horticulturists of Texas might feel free to accept the invitation of Galveston, and to co-operate with its citizens, toward a meeting and fair, much larger in scope and more extended in territory.

The invitation from the Galveston Chamber of Commerce is for a "joint meeting and horticultural fair of the States of Florida, Georgia, Alabama, Louisiana, North and South Carolina, Tennessee, Arkansas, Indian Territory, New Mexico and Texas."

The very largely extended territory covered by this invitation, coupled with your suggestion (June 11th,) that every state and county horticultural society in the South should be invited, and your expressed belief (June 24th,) that such a meeting will be held at Galveston, during 1896, makes it very clear to our Florida Committee that we (as initiatory joint promoters) should be exceeding the authority granted us by our Society in assuming so much more power than has been conveyed to us, either by the original resolution, or subsequent instructions.

It is equally clear to our Committee that it would be acting, to say the least, in very bad taste, for us to do anything that should in any way tend to hamper the success of this very desirable (though radically different) meeting, so liberally blocked out and provided for by Galveston, and that it is eminently fitting and proper for us to waive the claim, that your Committee so generously conceded, on the point of priority of invitation, (to a meeting that must, from the very nature of the territory to be covered, have been smaller) and thus positively set aside any possible confliction of interests, in favor of the larger meeting.

And, now, before making the suggestions that will appear later on in this letter, I wish to bring up another phase of the subject, that will, I think, convince you, that the Galveston meeting, with the Texas State Horticultural Society as sole promoter and inviter, is, not only the best arrangement, but that Florida, under the changed conditions from a year ago, will be glad to have you act upon this belief.

In April, 1894, when the resolution was passed inviting Texas to a Joint-Session with Florida, the horticulturists of this State were in a prosperous condition, and no signs of an impending calamity were apparent. When the invitation was presented by myself to the Texas Society, the conditions remained the same. And these conditions continued unchanged up to Dec. 29th, 1894, when, at one fell blow, a large portion of the income of the Florida horticulturists was swept away. Again, on Feb. 8th, 1895, the blow was repeated, this time intensified, wiping out the source of income, at least, so far as the near future is concerned. The trees, on which the fruit was frozen by the first freeze, were themselves badly crippled in the second,

and a large portion of them will have to grow again from the ground before anything in the way of income can be obtained from them. In the above, I refer principally, of course, to citrus fruits, in the culture of which a large portion of our horticulturists are principally interested. The damage, however, was not confined to citrus trees, or to the State of Florida, but the region in which the most loss was experienced, was (speaking for this State) the one that (without this disaster) would have sent the largest delegation to the joint meeting.

However much we may deplore it, the fact remains, that the attendance from Florida, at a joint meeting at Galveston, or elsewhere, will be largely reduced from what it would have been under the normal conditions that were existant when the invitation from Florida to Texas was presented.

With these facts in view, the suggestions I wish to make, or rather to emphasize, (as having already been made) are as follows:

That the Galveston meeting, under the auspices of the Texas State Horticultural Society, is the one to be held in 1896.

That the increased scope, and the changed conditions from a year ago, make it inexpedient for Florida to act in the capacity of joint initial promoter.

That in waiving the acceptance of Texas to act as joint promoter with Florida for a joint session of their respective Societies in 1896, it is with the best of feeling on the part of Florida, and in the interest of a more comprehensive meeting.

That, if the withdrawal of the Florida Committee, ends the life of the Texas Committee, the Texas Society will, doubtless, see fit to re-elect the same efficient Committee to carry out the work on the lines indicated by the Galveston invitation.

That, if more that three members are deemed advisable for this Committee, other members of the Texas Society can serve, under the circumstances, to better advantage that the Florida Committee.

That the Florida Society hopes for, and will expect, an invitation from the Texas State Horticultural Society to a meeting of the horticulturists of the entire South, to be held under the auspicies of the Texas Society, at Galveston, in 1896.

And finally, that at some time in the future when the results of the past winter's freezes in the Sub-Tropical Region have become less marked, and when nothing of greater magnitude would have to be sacrificed, that Texas, and the intervening Coast Country, will come to our State, upon our invitation, when we promise to repeat the good things we look for, at your hands, in 1896.

Trusting that this letter and these suggestions will be received, and acted upon by your Committee and your Society, in the same candid and friendly spirit in which they are written, and feeling sure that the views of our Society, as above set forth, are properly presented by our Committee, I remain, etc."

On July 10th, I received a reply from Mr. Munson, acquiesing in this view.

Inasmuch as your Committee has completed the work committed to it, they respectfully ask to be discharged.

(Signed) G. L. Taber,
Chairman.

Report adopted and Committee discharged.

PLACE OF NEXT MEETING.

[SEE MINUTES PAGES 1 TO 6, ITEMS 39 AND 54.]

During the Evening Session of the Second day, (See Minutes on Page 1, Item 39) Mahlon Gore, Mayor of Orlando, asked (and was given) permission to interrupt the programme for the porpose of inviting the Society to hold its next meeting in the city of Orlando. Mr. Gore first read an invitation from The Young Men's Business League, from the latter city, as follows:

Orlando, Fla., May 5th, 1896.

To the Secretary of the Florida State Horticultural Society.

Jacksonville, Fla.

Dear Sir:

At a meeting of the Young Men's Business League of this place held this date, an urgent invitation was extended to your Society to hold your next meeting in Orlando. The people of Orlando and Orange county will do all in their power to make the meeting a pleasant and profitable one.

Respectfully,

W. L. Palmer,
President.

By order of the League.

H. G. Garrette,
Secretary.

Mr. Gore then read an Official Invitation from the city of Orlando, as follows:

Mayor's Office.
Orlando, Florida,
Mahlon Gore, Mayor.

Orlando, Fla., May 2, 1896.

To the State Horticultural Society of Florida,

Gentlemen:

The city of Orlando, through its council and municipal officers, extends to your organization a cordial invitation to hold your annual meeting of 1897 here. We offer you ample hotel accommodations, a suitable room for your meetings, and a genuine Orlando welcome.

Very Respectfully,
Mahlon Gore
Mayor.

E. T. Sperry,
President Council.
H. H. Dickson,
James DeLaney,
C. W. Canfield,
J. H. Smith,
W. R. O'Neal,
A. G. Branham.
Members of City Council.
J. W. Preston,
City Marshal.

Attest:
(Seal) James K. Duke,
City Clerk.

In a short, but forceful speech Mr. Gore set forth the desirability of holding the next meeting of the Society in South Florida, and emphasized the cordial welcome which might be expected from Orlando and her citizens in the event of the meeting being held there in response to the invitations which he had submitted.

Considerable discussion as to the place of the next meeting followed Mr. Gore's remarks, there being a strong sentiment in the Society in favor of going to Orlando in accordance with the invitation submitted by Mr. Gore, and reiterated by many

members present from Orlando and Orange county.

Action on the matter was, however, deferred until the following day.

The matter of place of next meeting was again taken up on the morning of the third day, (See Minutes on Page 1, Item 54) and an invitation from the Jacksonville Board of Trade, inviting the Society to hold its next meeting in this city, was read by the Secretary, as follows:

Jacksonville, Fla., May 7th, 1896.

To the President and members of State Horticultural Association:

Your Association is cordially invited to hold their next annual meeting in the city of Jacksonville, and the rooms of the Board of Trade will be placed at your disposal. Jacksonville is the central point of transportation in the State, is the basing point for rates, and has the best facilities for entertaining large bodies of any city in the State. The utmost efforts of the citizens will be made to make your visit agreeable and pleasant.

Very respectfully,

T. H. Livingston,

Secretary Jacksonville Board of Trade.

After the reading of the invitation from the Jacksonville Board of Trade, a number of prominent members of that body urged upon the Society the desirability of holding the next meeting in the City of Jacksonville, which was followed by considerable discussion, which developed a division of sentiment as to whether the next meeting should be held at Orlando or Jacksonville. Upon a vote being taken, Orlando was selected as the place of next meeting. The vote standing as follows:

Jacksonville 34

Orlando 49

NECROLOGY.

Report submitted by W. S. Hart, James A. Harris, A. W. Stewart, Committee on Necrology.

(SEE MINUTES PAGES 1 TO 6, ITEMS 31 AND 52.)

Whereas, It has pleased the all wise Creator to summon from our midst, by death, during the past year, the members of the Florida State Horticultural Society whose names are here written:

J. W. Cook, of Okahumpka, Fla., died at Haledon, N. J., Aug. 31st, 1895, aged 60 years.

Chas. W. Hawkins, of Georgetown, Fla., at Burnside Beach, Fla., Sept. 11th, 1895, aged 36 years.

D. Greenleaf, of Jacksonville, Fla., at his home, Dec. 15th, 1895, aged 61 years.

John L. Rush, at his home in New Smyrna, Fla., Mar. 26th, 1896, aged 52 years.

Rev. John W. Harding, of Longmeadow, Mass., and Ormond, Fla., at his home in the latter place, April 14th, 1896, aged 74 years.

Dr. P. G. C. Hunt, of Longwood, Fla., in Indianapolis, Ind., April 24th, 1896, aged 68 years.

John C. Weld, of Port Orange, Fla., at his home on Aug. 26th, 1895, aged 67 years.

Whereas, The members of this Society

deeply feel the loss of these, our friends, and associates, Therefore be it

Resolved, That we hereby pay tribute to their memory in testifying to their sterling characters and public and private worth as well as to the value of their services in the upbuilding of this association, And be it further

Resolved, That while here recording our sincere sorrow over the loss of these co-laborers we also extend our heartfelt sympathy to the relatives and friends of the departed.

Charles W. Hawkins was born in North Attleboro, Mass., in 1859. He came to Florida early in the seventies. At the time of his death, he had been for twenty years a member of the firm of W. W. Hawkins & Sons, of the Lake George Nurseries. He was widely known and everywhere esteemed for his high moral character and sterling integrity. A wife and three children survive him.

John L. Rush was a native of Virginia, but had been a resident of Florida for about 20 years, and a member of this Society for three years. Though incapacitated for general field and grove work by a wound received in battle during the late war, still his taste for horticultural persuits led him to engage quite extensively in orange growing. He furnishing means, through successful commercial effort for his brother to use in the making of an extensive orange grove and the bringing up of same into profitable bearing under joint ownership. He was a quiet, peaceful and useful citizen, successful in business through honest merit, dealing fairly with all men; exceptionally thoughtful of the needs of the poor—ever seeking out and relieving their wants with a free hand. Mr. Rush never married. His loss will be sadly felt in the community in which he lived.

Doctor P. G. C. Hunt was born in Champaign Co., Ohio, in 1827. While still a lad he entered his brother's dental office in Indianapolis, learned the profession and made a life work of its practice with most eminent success. From his obituary, in the Dental Review, we take the following: "In the death of Dr. Phineas G. C. Hunt, Indianapolis lost one of her most prominent citizens, and the profession of dentistry in Indiana its foremost exponent. In 1870 he was made a doctor of dental surgery by the Ohio College of Dental Surgery, the Indiana Medical College having honored him with the M. D. title the year previous. During the war he was president of the State Dental Association, and ever since the enactment of the law creating the board of dental examiners he has acted as president. The history of American dentistry cannot be written without contributing to his praise." Dr. Hunt became interested in the horticulture of Florida in the early seventies, has owned property here since 1875, and at the time of his death possessed several fine groves. He was a firm believer in the future of the State and spent from one to six months at Longwood almost every year from 1876 to time of his death. He leaves four children—Mrs. H. A. Crossland, Miss Lula Hunt, Dr. G. E. Hunt and Mrs. Edward Kingsbury, all living in Indianapolis.

Rev. John W. Harding was a man of high education, broad culture and distinguished ability. For over forty years he was the loved and honored pastor of the only church (Congregational) of

Longmeadow, Mass., and at his voluntary retirement was made pastor emeritus. The "Bishop of Longmeadow" as Mr. Harding was often called was a man of great energy, wide charity and a loving heart. It was said of him "He loved everybody and everybody loved him." He was practical and observant and took an active kindly interest in everything and everybody about him. Through his acknowledged executive ability, his extensive travels, on both sides of the Atlantic, and his ready pen he became well known and widely useful outside of his pastoral work and it falls to the lot of but few men to leave behind so many sincerely sorrowing friends among the best ranks of society.

For some years past Mr. Harding spent his winters at Ormond, where he took charge of one of the churches through the colder half of the year. With all his characteristic energy he was engaged in his Master's work up to the time of his death.

Mr. Harding's eager interest in the horticulture and kindred pursuits of this State led him to travel over much of its territory, to join this Society some three years ago, and to write many able letters upon Florida topics for publication in the Springfield (Mass.) Republican, of which he was a highly valued correspondent for over thirty years.

Mr. Harding was born in Waltham, Mass. He leaves a wife, two sons and two daughters to survive him.

Mr. John Carpenter Weld was born in Livermore, Me. He resided for over twenty-five years in Cambridge, Mass., before moving to Florida, and was for many years a member of the Mass. Horticultural Society. Ill health caused his removal to Florida in the seventies. He was a modest, industrious and thrifty man, and an earnest member of the Florida State Horticultural Society from quite early in its history. He leaves a wife to mourn his loss.

Damon Greenleaf.

Damon Greenleaf first saw the light in Rockport, New York, on the 30th day of November, 1834. Since reaching his majority he has been eminently a man of affairs. One whose energy, integrity and business ability created a wide demand for his services and caused them to be of exceptional value wherever secured. As a husband and father, a soldier, a citizen, as a christian and a Mason, he was good and true, and strove manfully to perform his full duty. The many eulogies of the public press and lovingly spoken encomiums by those who mourn his death, bear eloquent testimony to his success in this endeavor.

Though for nearly 30 years—part of the time alone and some of the time with partners, he has owned and successfully conducted, at Jacksonville, one of the largest and handsomest jewelry, curio and art stores of the South, he has also found time to direct the making of one of the finest orange groves in the State, and to take an active and useful part in the formation and promoting of many State and local organizations and enterprises.

In token of Mr. Greenleaf's efforts to promote the horticultural interests of the State, attention is called to his share in the organization of the old Florida Fruit Growers' Association, of which he was made treasurer, and his well remembered and unexcelled exhibits of citrus and other fruits at the State Fairs, held under the management of that association.

He was also one of the founders of the Florida Fruit Exchange, a member of its

executive comittee and one of its most influential directors from its organization up to the time of his death.

In the same line were his willing services, rendered as one of the Directors of the Sub-Tropical Association and as the energetic manager of the Florida State Park Association.

In the death of Mr. Greenleaf this Society loses one of its ablest most progressive and highly respected members.

He leaves two daughters—Mrs. John H. Douglass and Miss Julia Greenleaf.

Dr. Geo. W. Davis.

(While the late Dr. Davis was not a member of the Florida State Horticultural Society, as one of the pioneers in the horticultural development of the State, it is meet, and in conformity to a widely expressed desire on the part of the membership, that his earnest efforts to promote the welfare of the fruit industry in this State and his valuable contributions to our Pomology, should be recognized in this Annual).

Dr. George Washington Davis died at his beautiful home in South Jacksonville, Florida, on the 8th of October, 1895. Dr. Davis was born in Western New York on the 22nd day of February, 1822, the anniversary of the birth of Washington, and it seemed proper and fitting that he should bear the name of the great American patriot and "Father of his Country."

During all his early manhood, Dr. Davis had a large and extensive medical practice in Seneca county, New York; but something over 20 years ago, impaired health induced him to come to Florida where he has lived ever since. Very soon after his arrival here he manifested a deep interest in the horticultural and pomological progress of the State, and was an earnest, working member of the old Agricultural Society, and most active and efficient in getting up, arranging and perfecting our early fruit exhibitions. He most worthily represented the "Florida Fruit Growers' Association" at the New Orleans Exposition; and never wavered in his devotion to our cause.

As a member of the Nomenclature Committee of the Florida Fruit Growers' Association (his associates on this Committee being Dr. C. J. Kenworthy and the late A. I. Bidwell) he helped to lay well the foundation for the classification of our citrus fruits.

Personally Dr. Davis was a man who inspired the greatest confidence and respect in all who knew him. He was a true and generous friend, a kind and obliging neighbor, and in all respects a good citizen and worthy man. He contributed a valuable practical treatise to the literature of the orange and was also a keen reader and a deep student of men and books. His last illness was severe and protracted, but he bore it, as he did all life's crosses, with "Christian patience and resignation."

RESOLUTIONS OF THANKS.

[SEE MINUTES PAGES 1 TO 6, ITEMS 18, 44, 50, 51, 53, 79 AND 81.]

Votes of thanks were unanimously extended as follows:

TO C. J. K. JONES,

For his special paper on "Microscopy in Horticulture." (See Minutes on page 1, Item 18).

TO A. J. MITCHELL,

For his special paper on "The Weather Bureau—Its Importance and Relations to the Producers of Florida." (See Minutes on page 1, Item 50).

TO THE F. C. & P. R. R.,

For its Whistle Signals. (See Minutes on page 1, Itm 51).

TO W. S. HART AND H. G. HASTINGS,

For their services as Associate Secretaries at the 1896 meeting. (See Minutes no page 1, Item 79).

Special Resolutions.

TO J. B. ANDERSON, TREASURER.

The following resolution, introduced by Geo. H. Wright, was unanimously passed. (See Minutes on page 1, Item 44.):

Whereas, Mr. J. B. Anderson has been Treasurer of the Florida State Horticultural Society from its incipiency, serving the Society efficiently for nine years, and

Whereas, it would have been the wish of the Society to have continued Mr. Anderson as Treasurer, but for his expressed wish to the contrary, based upon necessary absence from the State;

Therefore Be It Resolved, That the thanks of the Society be unanimously tendered Mr. Anderson for his competent administration as Treasurer and his zealous and effective efforts for the welfare of the Society.

General Resolutions.

The following Resolutions, reported by H. G. Hastings, Geo. H. Wood and J. B. King, Committee on Final Resolutions, were unanimously passed. (See Minutes on page 1, Items 53 and 81.):

TO THE JACKSONVILLE BOARD OF TRADE.

Resolved, That the thanks of the Florida Horticultural Society is hereby tendered to the Board of Trade of Jacksonville for the use of their rooms for the sessions of this meeting, and many other courtesies extended to us.

TO J. R. TYSEN, LITTLE BROS., AND WILSON & TOOMER.

Resolved, That the thanks of this Society are due, and are hereby tendered to J. R. Tysen, Little Bros., and Wilson & Toomer for their special efforts in providing for the comfort and entertainment of the members of the Society.

TO THE GENERAL PASSENGER AGENTS OF FLORIDA.

Resolved, That the Secretary be instructed to express to the General Passenger Agents of the Railroads of Florida our appreciation and thanks for the low rates charged members of the Society in attendance at this meeting.

TO THE JACKSONVILLE PRESS.

Resolved, That the thanks of this Society be extended to the newspapers of

Jacksonville for their full and able reports of the sessions of this meeting.

TO THE STATE PRESS.

The following motion by H. G. Hastings, Chairman of the Committee on Final Resolutions, was unanimously passed:

"That the Secretary be authorized to include in the published report, proper recognition of the courtesies extended to the Society by the Press."

In conformity with the above, the acknowledgments of the Society are hereby extended to the Press for the courtesies received, for efforts to promote the Society's welfare and for generous assistance in carrying out the Society's objects.

Special mention is made of the following papers which have filed marked copies with the Secretary:

STATE AGRICULTURAL PRESS.

Florida Farmer and Fruit Grower.
Florida Agriculturist.
Southern Ruralist.

STATE DAILIES.

Jacksonville Times-Union.
Jacksonville Citizen.
Jacksonville Metropolis.
Tampa Tribune.
Pensacola News.
Gainesville Sun.
Gainesville Democrat.
Tampa Times,
St. Augustine Herald.

STATE WEEKLIES.

Leesburg Commercial.
Tallahassee Tallahasseean.
Tallahassee Floridian.
Palatka Times-Herald.
Ocala Banner.
Bartow Courier-Informant.
Titusville Star.
Bronson Times-Democrat.
Titusville Advocate.
West Palm Beach Tropical Sun.
Daytona Journal.
Plant City Courier.
San Mateo Item.
Braidentown Journal.
Orange City Times.
DeLand News.
Brooksville News Register.
Green Cove Spring.
Fort Myers News.
Fort Myers Press.
St. Francis Facis.

STATE MONTHLIES.

Jacksonville Journal of Commerce.
Jacksonville Industrial Florida.

GULF STATES HORTICULTURAL.

Austin, Texas, "Horticultural Gleaner."

Huntsville, Ala., "Practical Nurseryman."

GENERAL.

New Orleans Picayune.

Florida State Horticultural Society.

Catalogue of Fruits.

1896.

PREFATORY NOTE.

"At the Pensacola meeting of the Society (April, 1893), in conformity to a resolution passed, a Committee was appointed to prepare a Catalogue of the fruits of the State on a systematic plan, on the same general lines adopted by the American Pomological Society, showing the relative adaptability to each section of the several fruits grown in the State.

"At the annual meeting for 1894 the Committee reported progress and was given further time.

"At the last annual meeting the Catalogue was submitted, and, it being impracticable for the Society to take it up for revision until it was printed, it was ordered included in the annual report for the current year in the form in which it came from the Committee.

"The Catalogue herewith presented is the result of extensive correspondence and collation, covering a perod of four years and aggregating several months' continuous labor. Prepared with the aid of many of the best informed horticulturists of the State, and approved by the Executive Committee of the Society, it has, perhaps, been perfected as far as was possible in an initial draft, and is submitted with some confidence.

"For important contributions to this Catalogue, acknowledgments are due as follows:

"To Lyman Phelps, E. H. Hart and E. S. Hubbard, for aid in preparing the lists of Citrus Fruits.

"To G. L. Taber (member of this Committee), for aid in preparing the lists of Deciduous Tree Fruits.

"To Emile Dubois, for aid in preparing the list of Grapes.

"To Jas. H. White and R. D. Hoyt (of this Committee), and especially to E. N. Reasoner, for aid in preparing the lists of Tropical Fruits."—From "Note of Submittal," May, 1895.

At the 1896 annual meeting of the Society, the Catalogue was not reached until the hour of adjournment had arrived, and it was then referred to the Executive Committee for "revision and adoption." Acting under this reference, the Executive Committee authorized the publication of the Catalogue in the 1896 Annual, in the form submitted by the Catalogue Committee, and without change from year—leaving final revision and adoption to the next meeting of the Society.

A. H. Manville,
Chairman Committee on Catalogue of Fruits.

PLAN OF CATALOGUE.

In making a complete Catalogue of the Fruits of Florida, indicating intelligibly in summarized and tabular form, the relative value of varieties for different sections, the wide-stretching territory, diversity of soil and climate, and the limited range of each of the numerous fruits, render it essential that the State be divided, so that regions allied throughout in their adaptability to fruits may be designated and referred to.

To this end, four districts have been formed, as described below. Geographical lines cannot be made to indicate pomological conditions with accuracy. More than approximate correctness could not be expected from an arbitrary division of this kind, especially where local conditions vary so greatly as in Florida. Working by general averages, some sections are unavoidably left in the wrong districts, judging by the standard of local conditions. The divisions, however, will be found to answer their purpose as well, or better, than any that could be made without further sub-divisions, which would be impracticable.

WESTERN NORTH FLORIDA—That portion of the State west of the Aucilla river.

EASTERN NORTH FLORIDA—That portion of the State between the Aucilla river and a straight line drawn across the State from the mouth of the St. Johns river to Cedar Keys.

CENTRAL FLORIDA—That portion of the State between the line above referred to and the counties constituting Southern Florida.

SOUTHERN FLORIDA—The counties of Brevard, Dade, Monroe, Lee, DeSoto and Manatee.

EXPLANATION OF ABBREVIATIONS.

The abbreviations and signs used in the columns which appear in the ensuing pages explain as follows:

ORIGIN—Of variety or species. (Refers to species, race, or geographical derivation, as best calculated to define.)
- A., American.
- E., English
- E. I., East Indies.
- F., Foreign.
- H., Hybrid.
- J., Japanese
- N., Native of Florida.
- O., Oriental.
- S. A., South America.
- W. I., West Indies.

ORIGIN—(Referring to peaches only).
- H., Honey race.
- N. C., North Chinese race.
- N. O. B. New Oriental Bloods.
- Per., Persian race.
- P-to, Peen-to race.
- S., Spanish race.

ORIGIN—(Referring to grapes only).
- A., Aestivalis.
- L., Labrusca.
- R., Riparia.
- V., Vulpina.

SEX—Of variety. (Referring to strawberries only).
- B., Bisexual.
- P., Pistillate.

USE—Of fruits.
- d., Dessert, eaten without culinary preparation.
- c., Culinary, including drinks, confections, condiments and domestic and manufactured preparations for gustatory use.
- s., Shipping, for general market; good long-distance carrier.
- n., Near-by market only. (Because of restricted demand or poor carrying qualities.)
- a., All purposes named above.
- w., Wine (Referring to grapes only.)

SIZE—Of fruit.
- l., Large
- m., Medium.
- s., Small.
- v., Very.

FORM—Of fruit
- b., Blunt (obtuse).
- c., Conical
- e., Eliptical.
- f., Flattened (oblate).
- h. Heart-shaped (cordate).
- k., Kidney-shaped (reniform).
- l., Lemon-shaped.
- o., Ovate.
- ob., Obovate.
- ol., Oblong.
- p., Pyriform.
- pt., Pointed apex.
- q., Quarter-marked.
- r., Round.

FORM—Of bunch (applies to grapes only).
- br., Broad.
- cl., Cylindrical.
- cp., Compact.
- sh., Shouldered.

COLOR—Of fruit except as to peaches, where it refers to flesh. Use adjective or noun according to application. Thus r. stands for "red" or "reddish"; r y., reddish-yellow"; r and y. "red and yellow" (as a yellow fruit with red cheek or other red markings).
- b., Black.
- bl., Blue
- br. Brown.
- bz., Bronze.
- c., Crimson
- cr., Carmine.
- d., Dark.
- g., Green.
- l., Light.
- o., Orange (not a shade of red, but the color of ripe oranges).
- p., Purple.
- r. Red
- s., Salmon.
- sc., Scarlet.
- v., Violet.
- w., White
- y., Yellow.

CLASS—Of fruit.
- C. Clingstone.
- F., Freestone.

QUALITY—Of fruit.
b., Best.
f., Fair.
g., Good.
v., Very.

FLESH—Of fruit (applies to strawberries only).
f., Firm.
m., Medium.
s., Soft.

SEASON—Of ripening of fruit.
E., Early.
Ev., Everbearing.
F., Fall.
L., Late.
M., Medium.
S., Summer.
Sp., Spring.
V., Very.
W., Winter.
(V. E., "very early"; L. M., "late medium", etc.)

VIGOR—Of tree, vine or plant.
g., Good grower.
m., Moderate grower.
v., Vigorous grower.

PROLIFICNESS—Of tree, vine or plant.
f., Fair bearer
g., Good bearer.
p., Prolific.
s., Shy.
v., Very.

ADAPTABILITY—Of variety or species to region named.

(*) One star—Recommended for region named.

(**) Two stars—Especially well-adapted and desirable.

(†) A dagger—New, recently introduced, or but little known, and promising.

(—) A dash—Not adapted, or found undesirable.

( ) Blank space—No mark or sign in "Adaptability" column indicates that no report has been made.

CITRUS FRUITS.

ORANGES.—(*Citrus aurantium*).

NOTE.—The development of orange culture in this State has given rise to a multiplicity of varieties many of which, while meritorious, have no distinctive qualities, or superiority as compared with others. It is impracticable to avoid this duplication by cutting down the list, which would exclude many desirable kinds that have been extensively planted, or about which there is demand for information. To avoid the confusion of a long list embracing many kinds without distinctive differences, the plan of using two kinds of type has been resorted to.

The names in heavy type are designed to constitute a complete list for the State, embracing varieties of the highest excellence in all the desired characteristics of season, quality, distinctiveness, productiveness, etc. The names in light type are those whose characteristics are possessed in an equal or superior degree by other varieties which appear in heavy type. Some varieties in light type equal others in heavy type having the same characteristics, but where there is a difference it is in favor of the varieties in heavy type. In cases of equal excellence, the best known has the preference. So that the varieties in heavy type as a whole, and without disparagement to other excellent sorts, may be said to embrace the leading kinds for general culture.

New, or comparatively unknown varieties also appear in light type; but for this distinction see "Adaptability" column.

NOTE.—In referring to the time of ripening in the column headed "Season", "very early" applies to varieties marketed in September and October; "early", to October and November varieties; "early medium", November and December; "medium", December January and February; "late medium", February and March; "late", March and April; "very late", April, May and later.

NOTE.—The region of orange production proper extends southward from Central Florida, overlapping the upper portion of Southern Florida. Therefore under "Adaptability" below the varieties have been starred for "Southern Florida"; here, however, the starring applies more particularly to the upper portion of the district.

(*See* ' *EXPLANATION OF ABBREVIATIONS,*" *on page iv.*)

NAMES.	Origin.	DESCRIPTION.								Adaptability.			
		Fruit.						Tree.					
		Use.	Size.	Form.	Color.	Quality.	Season.	Vigor.	Prolificness.	Western North Fla	Eastern North Fla	Central Florida.	Southern Florida.
SWEET ORANGES—*Citrus aurantium dulcis.*													
1 Acapulco	F	d s	l	r	o	g	M	g	p	—	—	*	*
2 Acis	F	d s	l	r	o	g	L	v	p	—	—	*	*
3 Amory Blood	F	d s	m	r	o r	g	E M	v	p	—	—	*	*
4 Atwood Navel	F	d s	m	r	e	o	g	M	g	s	—	—	*	*
5 Baldwin Blood		d s	m	r	e	o r	g	M	g	p	—	—	†	†
6 Beach No. 5		d s	l	r	e	o r	g	L M	g	p	—	—	*	*
7 Bell		d s	l	r	o	o	g	M	g	p	—	—	*	*
8 **Bessie**	N	d s				o	g	L			—	—	*	**
9 Boone (Boone's Early)	N	d s		r		l o		V E			—	†	†	*
10 Botelha	F	d s	m	r	r	o	g	M	g	g	—	—	*	*
11 Buttercourt	F	d s	m	r	r	o	b	M	m	v p	—	—	†	†
12 **Centennial**	N	d s	m	r	r	o	b	E M	v	p	—	—	**	*
13 Charley Brown	F	d s	l	f	o	o	g	M			—	—	*	*
14 China Sweet		d s	m		o	o	g	M			—	—	*	*
15 Circassian	F	d s	s m	r	o	o	v g	M	g	g	—	—	*	*
16 Colman (Sanford's Sweet Blood)		d s	m	r f	o r	o	v g	E M			—	—	*	*
17 Cunningham		d s	m			o	v g	E M	g	g	—	—	*	*
18 Drake Star	F	d s	l	r	o	o	g	M	v		—	—	*	*
19 **Double Imperial Navel**	A	d s	m	r	e	o	v g	M	g	s	—	—	*	*
20 Dulcissima	F	d s	s	r	o	o	v g	E	g	g	—	*	*	*
21 Dummit	N	d s	l		o	o	g	M	v	p	—	—	*	*
22 **Du Roi**	F	d s	m	r	o	o	g	L M	v	p	—	—	**	*
23 **Early Oblong**	F	d s	m	r	e	o	f	V E	g	p	—	*	*	*
24 Egg (Beach No. 1)	F	d s	s	r	o	o	f	V E	g	p	—	*	*	*
25 **Enterprise Seedless** (Starke Seedless)		d s	m	r	o	o	v g	E	g	v g	—	*	**	*
26 Exquisite	F	d s	m	r	o	o	v g	M	g	p	—	—	*	*
27 Foster	N	d s	m	r	o	o	g	E	g	p	—	*	*	**
28 **Harts Late** (Tardive, Brown, Excelsior)	F	d s	m	e	o	o	g	V L	v	p	—	—	**	**
29 **Higley Late**	F	d s	m	r	o	o	g	L	v	p	—	—	**	**
30 **Homosassa**	N	d s	m	r	o	o	v g	M	v	p	—	—	**	*
31 **Imperial Blood**	N	d s	m	r	r	o r	v g	E			—	—	*	**
32 **Jaffa**	F	d s	m	r	o	o	b	M	g	p	—	—	**	*
33 Jaffa Blood	N	d s	s	r	e	o r	b	M	g	p	—	*	**	*
34 Knickerbocker Blood		d s	m	r	e	o r	v g	M		p	—	—	†	†
35 Lamb Summer		d s		r	e	o		V L			—	—	*	*
36 Long	F	d s	m	r	o	o	g	M	g	p	—	—	†	†
37 Madam Vinous	N	d s	m	r	r	o	b	M	v		—	—	**	*
38 Magnum Bonum	N	d s	l	r	r	o	v g	M	v	g	—	—	*	*
39 **Majorca**	F	d s	m	r	r	o	b	L M	v	p	—	—	**	**
40 **Maltese Blood**	F	d s	s	r	e	o r	b	M			—	—	*	*
41 **Maltese Egg**	F	d s	s m	r	o	o	v g	M	g	p	—	—	*	*
42 **Maltese Oval** (Garey Mediterranean Sweet)	F	d s	l	r	e	o	v g	L	g	p	—	—	**	**
43 Mays Best		d s	m	r	r	o	v g	M	g	g	—	—	*	*
44 Mays St. Michael		d s	m	r	r	o	v g	M	g	g	—	—	*	*
45 Mediterranean Sweet	F	d s	l	r	e	o	v g	L	m	p	—	—	*	*
46 Melitensis Navel	F	d s	l	r	e	o	v g	E	g	f	—	†	†	†
47 **Nonpareil**	N	d s	l	r	r	o	b	E M	v	p	—	*	**	*
48 **Old Vini** (Beach No. 4)	N	d s	m	r	r	o	v g	M	v	p	—	—	*	*

ORANGES—Continued.

NAMES.	Origin.	DESCRIPTION. Fruit. Use.	Size.	Form.	Color.	Quality.	Season.	Tree. Vigor.	Prolificness.	Adaptability. Western North Fla.	Eastern North Fla.	Southern Florida.	Central Florida.
49 **Paper Rind** (St. Michael)	F	d s	s	e	l o	g	L M	g	v p	—	—	*	*
50 **Parson Brown**		d s	m	e	o	g	E	v	p	—	—	**	*
51 Peerless	N	d s	m	r	o	v g	M	v	p	—	—	*	*
52 **Pineapple**		d s				v g	M	v	p	—	—	*	*
53 Prata	F	d s	s	r	l o	g	M	g	g	—	—	*	*
54 Prolific	F	d s	m	r	o	v g	M	g	v p	—	—	†	†
55 Queen		d s	m	o	o	g	M	v	v p	—	—	†	†
56 **Ruby** (Sanguinea, Du Roi Blood)	F	d s	m	r	o r	v g	E M	g	p	—	*	*	*
57 St. Michael	F	d s	m	r	o	g	M	g	p	—	—	*	*
58 **St. Michael Blood**	F	d s	m	r	o	b	M	g	p	—	—	*	*
59 St. Michael Egg	F	d s	l	o	o	f	E			—	*	*	*
60 Sauls Blood		d s	m	f	o r	v g	M	g	p	—	†	†	†
61 Star Calyx	F	d s	l	r	o	g	M	g	g	—	—	*	*
62 Sustain Navel	F	d s	l	r	o	g	M	g	v s	—	—	?	?
63 **Sweet Seville** (Sanford's Sweet Seville)	F	d s	s	r	o	g	V E	v	p	—	*	*	*
64 Thorpe (Trophy)	N	d s	m	r	o	g	V E			—	*	**	*
65 Valencia Late	F	d s	l	e	l o	g	L	g	p	—	—	*	**
66 **Washington Navel**	F	d s	l	r e	o	b	E M	g	s	—	*	*	*
67 White	F	d s	l	r	l o	g	M	g	p	—	—	†	†
68 Whittaker	d s		m	r	o	v g	M	v	p	—	—	*	*
MANDARIN ORANGES—*Citrus Aurantium Nobilis.*													
69 **China** ("Mandarin")	F	d s	m	f	l o	g	E M	g	v p	*	*	**	*
70 Cleopatra ("Spice Orange")	F		s	f				v	v p	—	—	**	*
71 **Dancy Tangerine** ("Tangerine")	N	d s	l m	f	r	v g	M	g	v p	—	—	**	*
72 Japan Tangerine	F		l	f	r	g	M	g	p	—	—	**	*
73 **King**	F	d s	l m	f	r o	b	V L	v	v p	—	—	**	*
74 **Satsuma**	F	d s	m	f	o	v g	V E	g	v p	**	**	*	*
75 Sprack	N	d s								—	—	†	†
76 Tangerona	F	d s	m	f	l o	g	V E	g	p	—	—	†	†
77 Traveler		d s	m	f	o	g	M	g	p	—	—	†	†
BITTER ORANGES—*Citrus Aurantium Bigaradia.*													
78 **Bitter Sweet**	N	d c	l	r f	d o					—	*	*	*
79 Dwarf	F	c	l	r f	d o					—	*	*	*
80 Italian Sour	F	c	l							—	?	?	?
81 Navel	F	c	l							—	?	?	?
82 **Phillips Bitter Sweet**	N	d c	l	r f	d o					—	*	**	*
83 **Sour**	N	c	l	r f	d o					—	*	*	*

REMARKS—On varieties as numbered above: Nos. 25 and 50, desirable early sorts: 18, 49, 61 and 64, distinct; 19, native of Louisiana; 22, distinctly corrugated, desirable; 28 and 73, very desirable late sorts; 29, 30, 32, 39, 47 and 52, desirable; 70, unique rather than utile, quality poor; 71, a market favorite; 74, a favorite in early market; 78 and 82, very refreshing in summer; 83, refreshing acid; 10, 11, 15, 20, 22, 27, 37, 40, 53, 54 55, 57, 59, 61, 62 and 67, came from Thomas Rivers, of England the well-known nurseryman.

OF ORANGES, the leading fruit crop of the State, and great staple of the Central region, over five million boxes were produced in the season of 1894-95.

THE NAVEL VARIETIES are much esteemed on account of the delicate texture and superior quality of their fruit. They are usually shy bearers, although experience indicates that they are much more prolific upon "rough" lemon and trifoliata stocks than, as generally grown, upon orange stocks.

THE BLOOD VARIETIES are sweet, and therefore marketable, early in season, as indicated by the abbreviations in the "Season" column. At this time their distinctive character is not apparent, and they have little advantage in market over other early sorts. As the season advances, their ruby tints develop, until quite apparent on the exterior, and their quality continues to improve until, at full ripeness, they are equaled by few and surpassed by none. In locations sufficiently exempt from frost to permit their being held on the trees until they reach perfection, they bring high prices and are exceptionally profitable.

THE SATSUMA is valued on account of its hardiness, which is increased by being grafted upon the entirely hardy Trifoliata stock. As it is marketed before cold weather (it ripens very early), it is much planted in sections north of the usual range of oranges.

OTHER VARIETIES.—Excluding the Navels, Bloods and Satsuma, noted above, and without disparagement to other sorts of equal merit, the following are suggested as a desirable list for general planting, arranged in order of succession: *Very Early*, Boone, Sweet Seville; *Early*, Enterprise Seedless, Parson Brown; *Early Medium*, Nonpareil, Centennial; *Medium*, Pineapple, Jaffa, Homosassa; *Late Medium*, Majorca, Du Roi; *Late*, Bessie, King, Maltese Oval; *Very Late*, Hart's Late

Varieties distinctly marked in their exterior appearance, like the Navels, Bloods, Du Roi, etc., are, other things being equal, most desirable for market.

POMELOS—Grape Fruit (*Citrus Pomelanus*).

(*See "EXPLANATION OF ABBREVIATIONS," on page iv.*)

NAMES (*Varieties*).	Origin.	DESCRIPTION. Fruit. Use.	Size.	Form.	Color.	Quality.	Season.	Tree. Vigor.	Prolificness.	Adaptability. Western North Fla.	Eastern North Fla.	Central Florida.	Southern Florida.
1 Aurantium	N	d s	l m	r	l y	g	L M	v	v p	—	—	**	*
2 Hart	N	d s	l	r	l y	v g	L M	v	v p	—	—	**	*
3 Josselyn	N	d s	l	r	l y	g	L M	v	v p	—	—	**	*
4 Seedless										—	—	†	†
5 Triumph	N	d s	s m	r	l y	v g	L M	v	v p	—	—	**	*
6 Walter	N	d s	l m	r	l y	g	L M	v		—	—	**	*

THE POMELO.—Growing the Pomelo for market is a comparatively recent development, but considerable quantities are now shipped, and its culture is rapidly extending. It has proved popular in the general market, and its culture profitable. Its range of adaptability is about the same as the orange. Most of the older trees were planted before named varieties were introduced The above list comprises the leading kinds now generally planted.

LEMONS—(*Citrus Limonum*).

(*See "EXPLANATION OF ABBREVIATIONS", on page iv.*)

NAMES (*Varieties*).	Origin.	DESCRIPTION. Fruit. Use.	Size.	Form.	Color.	Quality.	Season.	Tree. Vigor.	Prolificness.	Adaptability. Western North Fla.	Eastern North Fla.	Central Florida.	Southern Florida.
1 Belair	F	c s	m	bl	l y	b	F	v	v p	—	—	*	**
2 Eureka	F	c s	m	l	l y	g	F	v	v p	—	—	*	**
3 Sicily (*Sanford's Thornless*)	F	c s	m	l	l y	b	F	v	v p	—	—	*	**
4 Villa Franca	F	c s	m	l	l y	b	F	v	v p	—	—	*	**

THE LEMON. Lemon growing in Florida is an industry of some importance, the crop of 1894 being estimated at 150,000 boxes. The tree stands less cold than the orange, and planting is confined to lower latitudes and locations of comparative frost exemption. The foregoing varieties are highly esteemed and generally planted.

MINOR CITRUS FRUITS.

(*See "EXPLANATION OF ABBREVIATIONS" on page iv.*)

NAMES.	Origin.	DESCRIPTION. Fruit. Use.	Size.	Form.	Color.	Quality.	Season.	Tree. Vigor.	Prolificness.	Adaptability. Western North Fla.	Eastern North Fla.	Central Florida.	Southern Florida.
KUMQUATS Kin Kans (*Citrus Japonica*)													
1 Marumi	F	d c s	s	r	o			m	p	—	*	**	*
2 Nagami	F	d c s	s	o	o			m	p	—	*	**	*
LIMES (*Citrus limetta*).													
3 Mexican	F	c s	m	l	l y	v g		v	v p	—	—	*	**
4 Persian	F	c s	m		l y					—	—	*	**
5 Tahiti	F	c s		l	l y	v g				—	—	*	**
CITRONS (*Citrus medica*).													
6 Lyman	F	c	m	l	oy	g				—	—	**	**
7 Lemon	F	c	l	l	oy	g				—	—	**	**
8 Orange	F	c	s	r	oy	f				—	—	**	**
SHADDOCKS (*Citrus decumana*).													
9 Blood	F		l	r	l o	f		v		—	—	**	*
10 "Forbidden Fruit"	F									—	—	**	*
11 Mammoth (or Orange)	F		l	r	l o	f		v		—	—	**	*
12 Bergamots (*Citrus bergamium*)										—	—	*	
13 Otaheites (*Citrus sinensis*)										—	—	*	*
14 Trifoliatas (*Citrus trifoliata*)										*	*	*	*

REMARKS.—On varieties and species as numbered above: No. 12, grown as an ornamental, yields an essential oil; 13, grown as an ornamental, and as a stock for dwarfing—fruit valueless; 14, a hardy species, grown as an ornamental, extensively used as a stock and for hedges—fruit valueless.

DECIDUOUS FRUITS

PEACHES—(*Persica vulgaris*).

NOTE.—The time of ripening of any particular variety varies considerably, in Florida, as elsewhere, according to season and locality. Under head of "Season," "very early" means April 20 to June 15; "early," from June 1 to July 15; "medium," from July 1 to August 10; "late," from August 1 to September 20; "very late," September 10 to November 1.

NOTE—"Color," as applied to peaches, refers to the flesh, and not to the exterior, as with other fruits.

(*See "EXPLANATION OF ABBREVIATIONS", on page iv.*)

NAMES (*Varieties.*)	Origin.	DESCRIPTION.								Adaptability.			
		Fruit.						Tree.					
		Use.	Size.	Class	Color.	Quality.	Season.	Vigor.	Prolificness.	Western North Fla	Eastern North Fla.	Central Florida.	Southern Florida.
1 Alexander	Per	d s	m	F	w	f	V E	g	f	**	—	—	—
2 Amelia	Per	d e n	l	F	w r	b	E	g g	f	*	*	—	—
3 Angel	P-to	d s	l	F	w	b	E	v	v p	*	**	**	**
4 Bidwell's Early	P-to	d s	m	C	w	g	V E	g	p	—	*	**	**
5 Bidwell's Late	P-to	d s	l	C	w	g	E	v	v p	—	**	**	**
6 Cabler's Indian	S	d e n	l	C	r	g	M	g	f	**	*	—	—
7 Chinese Cling	N C	d n	l	C	w	g	M	g g	f	*	—	—	—
8 Chinese Free	N C	d n	l	F	w	g	M	g g	f	*	—	—	—
9 Climax	H	d s	m	F	w	g g	E	g g	p	*	*	—	—
10 Colon	H	d s	m	F	w r	v g	E	g g	p	†	**	†	—
11 Columbia	S	d e n	l	F	y	g	M	g g	f	*	—	—	—
12 Countess	S	d n	l	F	w	g	M	v	p	**	*	*	†
13 Crawfords Early	Per	d s	l	F	y	b	E	g	f	*	—	—	—
14 Early Cream	H	d s	m	F	w	g	E	g g	p	**	**	*	—
15 Elberta	N C	a	l	F	y	b	M	g g	p	**	—	—	—
16 Ferdinand	H	d s	m	C	w r	b	E	g g	p	†	**	†	—
17 Fleitas (Yellow St. John)	Per	d s	l	F	y	g	E	g g	f	†	—	—	—
18 Florida Crawford	S	d e n	l	F	y	b	M	g g	f	**	*	*	—
19 Foster	Per	d s	l	F	y		E		f	†	—	—	—
20 General Lee	N C	a	l	C	w	g	M	g	t	**	*	—	—
21 Gibbons October	S	d n	l	F	w	g	V L	g g	f	**	*	*	—
22 Honey	H	a	m	F	w	g g	E	g g	v p	*	**	*	—
23 Imperial	H	a	l	F	w	v g	E	g g	p	**	**	*	—
24 Japan Dwarf Blood	NOB	d s	m	F	r	f	V E	m	f	*	*	†	—
25 Jessie Kerr	Per	d s	m	F	w	f	V E	g	f	**	—	—	—
26 Jewel	P-to	d s	m	F	w	g	V E	g	p	—	†	†	—
27 La Magnifique	S	d e n	m	C	w	g g	L	g g	g	*	*	†	—
28 La Reine	S	d e n	m	C	w	g g	M	g g	g	*	*	†	—
29 Maggie	P-to	d s	m	C	w	g g	V E	g g	g	—	*	**	**
30 Mountain Rose	Per	d s	m	F	w	b	E	g g	f	*	—	—	—
31 Onderdonk	S	d e n	m	F	y	g g	M	g g	f	*	*	—	—
32 Oviedo	H	a	l	F	w	v g	E	g g	p	†	**	†	—
33 Pallas	H	d s	m	F	w	g g	E	m	f	*	*	—	—
34 Peen-to	P-to	a	m	F	w	g g	V E	v	v p	—	*	**	**
35 Powers September	S	d n	m	F	w	g	V L	g	f	**	*	*	—

PEACHES -Continued.

NAMES (*Varieties.*)	Origin.	DESCRIPTION. Fruit. Use.	Size.	Class.	Color.	Quality.	Season.	Tree. Vigor.	Prolificness.	Adaptability. Western North Fla	Eastern North Fla.	Central Florida.	Southern Florida.
36 Red Ceylon	NOP	c	m	F	r	g	V E	g	p	—	—	*	*
37 Reeves Mammoth	S	den	m	F	w	g	M	g	f	*	*	*	—
38 Sneed	N C	d s	m	C	y	g	V E	g	g	**	—	—	—
39 Taber	H	d s	m	C	w r	g	E	g	p	†	**	†	
40 Thurber	N C	den	l	F	w	g	M	g	f	*	*	—	—
41 Triana	H	d s	m	F	w r	g	E	g	p	†	**	†	
42 Victoria	S	den	l	F	y	g	L	g	f	**	*	*	
43 Waldo	P-to	d s	m	F	w	g	V E	g	p	—	**	**	*
44 Yum Yum	P-to	d s	m	C	w	g	V E	g	g	—	*	**	**

REMARKS—No 6, a fine blood peach; 25, much like Alexander in tree and fruit, preferred to the latter by many; 26, a new variety, seedling of Waldo, introduced by T. K Godbey and claimed by him to ripen two weeks earlier than Waldo, although blooming at same time; 3 and 43 bloom a month later than any other varieties of the Peen-to race (except Jewel)—hence especially desirable where late frosts occur; 34, flat, like a tomato; all the other varieties listed are of standard peach shape; 36, not a dessert peach, but especially desirable for cooking.

THE PEACH is successfully grown in localities throughout the greater portion of the State, and in the Central and Northern districts is extensively produced for shipment to Northern markets. As a rule, for this purpose, only those varieties are grown which are marked "early" and "very early" in the above table, and which come in before the general crop farther north To this there are some exceptions, notably in Western North Florida where some mid-season varieties like Elberta, are successfully grown for shipment.

While the list of peaches grown in the State embraces many varieties, the various sections, covering a wide range of latitude and longitude, differ to such an extent in soil, climate and conditions of local environment, that the varieties adapted to a particular region are comparatively limited in number. A first and vital essential to successful peach production is the adaptability of variety to locality; in general this is true of peaches to a greater extent than other fruits, and especially so in Florida.

THE BEST VARIETIES.

LOWER CENTRAL AND SOUTHERN DISTRICTS.—For very early market, Bidwell's Early, Maggie, Peen-to, Waldo, Yum Yum; for early market, Angel, Bidwell's Late. The foregoing are all of the tropical Peen-to race. Red Ceylon, also a tropical peach, is well adapted. For succession for home use, try varieties of Honey and Spanish races starred for lowest ranges, which do fairly well in localities.

UPPER CENTRAL DISTRICT.—For very early and early market, the same varieties recommended for Lower Central and Southern Districts, except that for early market, in many localities the following varieties of Honey race should be added: Colon, Ferdinand, Early Cream, Honey, Imperial Oviedo, Taber, Triana. Some of the Spanish varieties succeed, such as Countess, Florida Crawford, Gibbon's October, La Magnifique, La Reine, Power's September. Reeves Mammoth, Victoria

EASTERN NORTH FLORIDA.—For very early market, Waldo, and perhaps Jewel; for early market, Angel, Bidwell's Late, and the varieties of Honey race named above Here (with the exception of the new Jewel) of the Peen-to race only Bidwell's Late and the late-bloomers Angel and Waldo are

retained. These and the above-named varieties of Honey and Spanish races are well adapted; other Honey and Spanish varieties do well, but the above are the leading sorts. Some varieties of Northern Chinese race do fairly well in localities.

WESTERN NORTH FLORIDA.—For very early market, Alexander and Jessie Kerr; for early market, the Honey varieties named above, to which add Pallas and Climax. For mid-season market, Elberta, General Lee and Thurber. Alexander, Jessie Kerr and General Lee are quite extensively grown, but Elberta is the leading peach. Here the Peen-to varieties are discarded. Like the Honey varieties, the Spanish varieties do well. Most varieties of Northern Chinese race and some Persians including those named and others are well adapted. Great hopes are entertained of the recently imported Japan Dwarf Blood, which is the first of all to ripen, but it is of fair quality only, and a moderate grower.

PLUMS—(*Prunus*).

NOTE.—"J", as used in "Origin" column, means that the variety belongs to the Japanese class (*P. triflora*) but not necessarily imported from Japan.

(*See "EXPLANATION OF ABBREVIATIONS," on page iv.*)

NAMES (*Varieties*).	Origin.	DESCRIPTION.									Adaptability.			
		FRUIT.							TREE.					
		Use.	Size.	Form.	Color.	Class.	Quality.	Season.	Vigor.	Prolificness.	Western North Fla.	Eastern North Fla.	Central Florida.	Southern Florida.
1 Abundance	J	a	l m	r p t	y&r	C	g	E	v	p	*	*		
2 Babcock	J	a	l	r p t	r	C	g	M	v	p	*	**		
3 Bailey	J	a	l	r	o&r	C	g	E			†	†		
4 Botan	J	a	l m	r c	y&r	C	g	E	v	p	*	**		
5 Burbank	J	a	l m	r	r&y	C	b	E	v	p	**	**		
6 Chabot	J	a	l	e c	l r	C	g	M			*	*		
7 Excelsior	J H	a	m	r	r p	C	b	V E	v	p	*	*		
8 Golden Beauty	A	a	m	r	y	C	g	L			*	†		
9 Kelsey	J	a	v l	h	g y	F	g	L	v	p	*	*		
10 Normand	J	a	l m	b c	y	F	g	E			†	†		
11 Pissard	?	c	m	r	p r	C	g	E	v	s	*	*	*	
12 Red Nagate	J	a	l m	e c	r p	C	g	V E			†	†		
13 Wild Goose	A	a	m	r	r	C	g	E			*	—	—	—
14 Willard	J	a	l m	r	d r	F	g	V E			†	†		
15 Yellow Japan	J	a	l	r	y&r	C	g	M			*	*		

REMARKS.—No. 4, well known and widely planted throughout the Lower South, where it is one of the best; introduced by P. J. Berckmans in 1886 as Botan; it has been sold under the names Sweet Botan, Yellow Fleshed Botan, Abundance and Berckmans, but it is doubtful if any of these names are properly applied to this variety. No. 7, seedling of Kelsey, supposed to be crossed with Cumberland or Wild Goose. No. 11, a handsome ornamental; fruit and foliage blood red.

PLUMS.—While plum growing has not attained commercial importance in this State, the recent introduction of the Japanese varieties, many of which seem well suited to sections of upper Florida, has led to the general planting of this fruit. So far as tested, Burbank, Babcock, Botan and Kelsey have proved most desirable.

PEARS—(*Pyrus communis*).

(*See "EXPLANATION OF ABBREVIATIONS", on page iv.*)

NAMES (*Varieties*).	Origin.	DESCRIPTION. Fruit. Use.	Size.	Form.	Color.	Quality.	Season.	Tree. Vigor.	Prolificness.	Adaptability. Western North Fla.	Eastern North Fla.	Central Florida.	Southern Florida.
1 Bartlett	E	a	l	b p	y	v g	E	m	f	*	—	—	—
2 Garber	O	a	l	rbp	y&r	g	M	v		†	†	†	—
3 Jefferson		s					V E	g		*	†	—	—
4 Kieffer	O	a	v l	rbp	y&r	g	V L	v	v p	**	**	*	†
5 Lawson							V E	m	f	*	—	—	—
6 Le Conte	O	a	l	olbp	g	g	E	v	v p	**	**	*	†
7 Smith	O	a	l	e p	g	g	E	v	p	**	**	*	

REMARKS.—No. 3, very early, showy; 4, desirable for late market; 6, 7, desirable for early market.

PEARS.—Pear culture has developed into a considerable industry in the Northern and Northwestern regions of the State. The LeConte and Kieffer are planted almost exclusively, the former largely predominating. Smith promises to rival LeConte as an early variety for general planting, having some advantages over the latter, perhaps, in quality and earliness, and being equally vigorous and productive. For general market, the three varieties named give much better results than other sorts.

STOCKS.—It is essential to success with pears in this State, that they be propagated upon LeConte or Japan pear stocks.

GRAPES—(*Vitis—Labrusca, Æstavalis, Vulpina, etc.*).

(*See "EXPLANATION OF ABBREVIATIONS", on page iv.*)

NAMES (*Varieties*).	Origin.	DESCRIPTION. Fruit. Use.	Bunch. Size.	Bunch. Form.	Berry. Size.	Berry. Form.	Color.	Quality.	Season.	Vine. Vigor.	Prolificness.	Adaptability. Western North Fla.	Eastern North Fla.	Central Florida.	Southern Florida.
1 Concord	L	dnw	l	s h	l	r	b	g	M	g	f	*	*	*	
2 Cynthiana	A	d w	m	shcp	s	r	b	v g	L	v	f	**	**	**	*
3 Delaware	H?	a	s	shcp	s	r	r	b	M	g	p	*	*	*	—
4 Diamond	L	d s	m	shcp	m	r	w	g	V E	v	p	—	*	*	—
5 Elvira	RH	w	s	c p	m	r	w	g	M	g	p	*	*	*	—
6 Flowers	V	dnw	s	r	v l	e	b	f	V L	v	p	**	**	**	*
7 Goethe	H	d n	m		v l	e	w	v g	L	v	p		*	*	
8 Herbemont	A	d w	m	shcp	s	r	b	v g	L	v	p	—	*	*	*
9 Ives	L	s w	m	c p	m	r e	b	f	V E	v	p	**	**	*	*
10 Niagara	L	d s	l	c p	m	r	w	g	V E	v	p	—	**	**	*
11 Norton	A	d w	m	shcp	s	r	b	g	L	v	f	**	**	**	—
12 Salem	H	d n	m	shcp	l	r	r	v g	M	v	f	—	*	*	—
13 Scuppernong	V	dnw	s	r	v l	r	bzw	g	V L	v	v p	**	**	**	**
14 Surprise	?	d n	l	c l	v l	r e	rb	v g	M	v	f	—	*	*	—
15 Thomas	V	dnw	s	r	v l	r	rb	g	V L	v	v p	**	**	**	**
16 Wilder	H	d n	l	b r	v l	r	b	v g	M	v	f		*	*	

REMARKS—Numbers 6, 13, 15, entirely free from fungus diseases; 2, 9, 11, almost free from fungus diseases; 1, 3, 4, 5, 10, subject to fungus diseases in wet seasons; 8, 12, 14, 16, subject to fungus diseases; 8, stars apply especially to the East Coast

GRAPES.—In many locations throughout the State varieties (as indicated by the starring above) succeed well, and are quite extensively grown for shipment to Northern markets as well as for local consumption and the manufacture of wine.

FOR MARKET.—Delaware, Niagara, and Ives (only) have proved a success as shipping grapes for distant markets (when properly packed). Diamond, on account of its compactness and tendency to crack, does not stand long shipment.

FOR RED WINE.—Cynthiana, Norton and Ives are the red-wine grapes of Florida, as they are the red-wine grapes of the United States. Especially is this true of the first two named; their juice is dark and rich in saccharine matter, and the wine made from these two grapes is said to possess great medicinal properties, owing to its large percentage of tannin. From Thomas, a red wine of a special character can be made, which finds many admirers in the South

FOR WHITE WINE.—Elvira, Delaware and Niagara are, among the varieties above named, the best grapes for white wine—especially dry wine. It is from Elvira that the celebrated San Luis Sauternes are made, which have established the reputation of Florida wines. Delaware is better adapted to the manufacture of sweet wine, and from Niagara a good dry wine can be made—much superior to the article made from Northern grown Niagaras, our Florida Niagaras being almost entirely free from that foxy taste so prominent in all Northern Labruscas

THE MUSCATINE VARIETIES.—Flowers, Scuppernong and Thomas belong to this class, which is very distinct from the other grapes named. They are prodigious growers and bearers, a popular dessert and wine fruit in the South, but are not grown for Northern market

EUROPEAN VARIETIES (*V. vinifera*) have finally proved an entire failure—even with those who, for a few years, seemed to have succeeded in growing them

OTHER VARIETIES.—Besides the varieties described in the list above, other varieties may do well in particular localities or favored locations, and may be satisfactorily grown for family use, but varieties not included in th s Catalogue should not be attempted on a large scale until their value has been demonstrated by experiment.

KAKI—Japanese Persimmons (*Diospyros Kaki.*)

(*See "EXPLANATION OF ABBREVIATIONS", on page iv.*)

NAMES (*Varieties.*)	Origin.	DESCRIPTION. Fruit. Use.	Size.	Form.	Color.	Quality.	Season.	Tree. Vigor.	Prolificness.	Adaptability. Western North Fla.	Eastern North Fla.	Central Florida.	Southern Florida.
1 Costata	J	d s	m	rcpt	s r	g	L	v	p	**	**	**	*
2 Hachiya	J	d s	v l	obpt	b r	f	E	g	s	*	*	*	*
3 Hyakume	J	d s	l	rfob	o r	g	M	v	p	**	**	**	*
4 Okame	J	d s	l	r f g	b cr	v g	E&M	v	v p	**	**	**	*
5 Tabers No. 129	J	d s	m	rpt	o r	g	V E	v	p	**	**	**	*
6 Tane-nashi	J	d s	l	rcpt	l r	b	M	g	g	**	**	**	*
7 Tsuru	J	d s	l	olpt	b r	g	VL	v	v p	**	**	**	*
8 Yeddo-ichi	J	d s	m	r f	d r	v g	M	g	g	**	**	**	*
9 Yemon	J	d s	l	r f g	o&r	v g	M	v	p	**	**	**	*
10 Zengi	J	d s	s	r f	d r	g	V E	v	v p	*	*	*	*

THE KAKI succeeds well throughout the State, and is generally, though not extensively, grown. For market, this delicious fruit has the merit of shipping well and keeping long. While new markets are often reluctant to take hold of it, wherever known it sells well.

NOMENCLATURE.—While there has been much confusion in regard to the names of varieties, the

above kinds are now as well known as the leading varieties of other fruits; they embrace the most valuable kinds, and the names as given are correctly applied.

CHARACTERISTICS.—Some of the varieties have dark flesh, others light flesh, still others a mixture of the two. The light and dark flesh differ radically in texture and consistency as well as appearance, and when found in the same fruit are never blended but always distinct. The dark flesh is never astringent; the light flesh is astringent until it softens The dark-fleshed fruit is crisp and meaty, like an apple, and is edible before it matures. Some of the entirely dark-fleshed kinds improve as they soften, like Hyakume and Yeddo-ichi; others are best when still hard, like Zengi and Taber's No. 129. As they are good to eat before they are ripe, it is not so important that the dark-fleshed kinds be allowed to reach a certain stage before being offered to consumers unfamiliar with the fruit. The light-fleshed kinds, and those with mixed light and dark flesh, are very delicious when they reach the custard-like consistency of full ripeness. In some the astringency disappears as the fruit begins to soften, as with Yemon, and in a less degree with Okame and Tane-nashi; in others it persists until the fruit is full ripe, as with Tsuru. The light-fleshed kinds should not be offered to consumers unacquainted with the fruit until in condition to be eaten. A person who has attempted to eat one of them when green and "puckery" will not be quick to repeat the experiment. Seeds accompany the dark flesh. The light-fleshed kinds are seedless. The kinds with mixed flesh have seeds in proportion to the quantity of dark flesh. Hyakume, Zengi and Hachiya are usually overspread at the blossom end with penciling or net-work of dark lines, and this sometimes occurs in other kinds.

VARIETIES.—Tane-nashi, Okame, Yemon and Yeddo-ichi excel in quality, perhaps in the order named. Okame (on account of the difficulty of getting the fruits all in the same stage of ripeness) and Hachiya are not as good shippers as the others; the latter is valued for its immense size and showiness. Okame, on account of its long season, exquisite beauty, and superior quality, is the best for home use and local market. Zengi and Taber's No. 129 are valued for their earliness, as are Tsuru and Costata for their lateness. Costata is very distinct and handsome in both tree and fruit Hyakume is most generally grown of the dark-fleshed kinds. Tane-Nashi is, perhaps, most highly esteemed in market.

STOCK.—The Kaki should be grafted on the native persimmon, on which it is much more satisfactory than upon its own or imported stocks.

MINOR DECIDUOUS FRUITS.

(*See "EXPLANATION OF ABBREVIATIONS", on page iv.*)

NAMES.	Origin.	DESCRIPTION. Fruit. Use.	Size.	Form.	Color.	Quality.	Season.	Tree. Vigor.	Prolificness.	Adaptability. Western North Fla	Eastern North Fla.	Central Florida.	Southern Florida.
APPLES—*Pyrus malus.*													
1 Jennings	N ?	d n	l	f	g	g	E	v	p	*	*	†	—
2 Red Astrachan	F	d n	l	r	r	g	E			*			
APRICOTS—*Armeniaca vulgaris.*													
3 Santa Fe	N	d n	m	r f	y&r	g	V E	v		*	*	†	
FIGS—*Ficus carica*													
4 Black Ischia	F	d c n	m		b	g	S				*	*	
5 Blue Genoa	F	d c n	m		b l	g	S	m			*	*	
6 Brown Turkey	F	d c n	m		b r	b	S	m	g		*	*	
7 Brunswick	F	d c n	l		v b r	g	S	v	v p		*	*	
8 Celestial	F	d c n	s		p v	b	S	v	v p	*	*	*	
9 Green Ischia	F	d c n	m		g	g	S	v			*	*	
10 Lemon	F	d c n	m		y	g	S	v	v p		*	*	
11 White Marseilles	F	d c n	m		y w	g	S	v	v p		*	*	

MINOR DECIDUOUS FRUITS—Continued.

NAMES (*Varieties*).	Origin.	DESCRIPTION. Fruit. Use.	Size.	Form.	Color.	Quality.	Season.	Tree. Vigor.	Prolificness.	Adaptability. Western North Fla.	Eastern North Fla.	Central Florida.	Southern Florida.
MULBERRIES—*Morus nigra.*													
12 Downing	A		m	ol	b	g	E	v	s	*	*	*	*
13 Hicks	A		m	ol	b	f	E&L	v	v p	*	*	*	*
14 Stubbs	A		l	ol	b	g	M	v	p	*	*	*	*
15 Late (?)	A		m	ol	rb	b	L	v	p	*	*	*	*
POMEGRANATES—*Punica granatum.*													
16 Acid		d	l	r	ry		F	v	p	*	*	*	
17 Purple		d	l	r	ry	b	F	v	p	*	*	*	
18 Sweet		d	l	r	ry	g	F	v	p	*	*	*	

REMARKS.—Nos. 1 and 2, home use; 3, freestone, home use; 12, unsatisfactory bearer; 13, enormously productive; 14 and 15, superior quality acid; 17, most desirable.

APPLES AND APRICOTS—Are not recommended for general culture, although the varieties named give fair results in the home orchard in the regions indicated.

THE FIG—A most delicious fruit for the table and culinary use, thrives everywhere. It is not grown for shipment, but is one of the most valuable and generally grown home-use-and-local-market fruits. All the varieties named are desirable.

MULBERRIES—Are well adapted to all sections. They are largely grown for swine, poultry, and as a toll for birds; and, by some, the more acid kinds are esteemed for table use.

THE POMEGRANATE—An agreeable fruit, desirable for occasional use, and especially valuable as an ornamental shrub or tree, is not grown for market, but most plantations have a few trees.

NUTS.

(*See "EXPLANATION OF ABBREVIATIONS", on page iv.*)

NAMES.	Origin.	* DESCRIPTION. Fruit. Use.	Size.	Quality.	Tree. Vigor.	Prolificness.	Adaptability. Western North Fla.	Eastern Forth Fla.	Central Florida.	Southern Florida.
CHESTNUTS—*Castanea.*										
1 Chincapin (*C. pumila*)	A	d n	s	v g	v	p	*	*	*	†
2 Japan Chestnut (*C. japonica*)	F	d c s	v l	g	v	g	*	*		

NUTS—Continued.

NAMES (*Varieties*).	Origin.	DESCRIPTION. Fruit. Use.	Size.	Quality.	Tree. Vigor.	Prolificness.	Adaptability. Western North Fla.	Eastern North Fla.	Central Florida.	Southern Florida.
PECANS—*Carya olivæformis.*										
3 Paper Shell	A	d s	l	b	v	p	**	*	*	
WALNUTS—*Juglans.*										
4 Japan Walnut (*J. Sciboldi*)	F	d	m	b	v		†	†	†	†

NUTS.—The Pecan has been long grown in the State in a small way; it flourishes in many localities, and its culture is profitable. The Japan Chestnut, of comparatively recent introduction, has, so far, proved well adapted. The Japan Walnut, of still more recent introduction, promises well; it is certainly the most desirable of the Juglans in this State.

MISCELLANEOUS FRUITS.

STRAWBERRIES—(*Fragaria*).

(*See "EXPLANATION OF ABBREVIATIONS", on page iv.*)

NAMES (*Varieties*).	Origin.	DESCRIPTION. Fruit. Sex.	Use.	Size.	Form.	Color.	Quality.	Flesh.	Season.	Plant. Vigor.	Productiveness.	Adaptability. Western North Fla.	Eastern North Fla.	Central Florida.	Southern Florida.
1 Cloud		P	a	l	bo	d c	f	m	E & L	v	p	**	**	*	
2 Federal Point		B	d n				g	m		v	p		*	*	
3 Hoffman	A	B	s	m	c	d c	f	f	VE	m	f	*	*	*	
4 Lady Thompson .		B	s	l	o	c	f	f	E	m	p	*	*		
5 Michel		B	d n	l	b c	y r	b	s	VE	v	p	*	*		
6 Newnan		B	a	m	o	c	f	f	E & L	m	p	**	**	**	
7 Wilson		B	a	m	o	d c	g	f	E & L	m	p	**	**	*	

REMARKS.—No. 2, highly prized for home use—not recommended for shipping.

STRAWBERRIES—Are extensively grown in sections of the upper portion of the State, for Northern markets. The Newnan and Wilson have been found most desirable for shipping. The Hoffman and Cloud are also raised to some extent for this purpose.

MINOR MISCELLANEOUS FRUITS.

(*See "EXPLANATION OF ABBREVIATIONS," on page iv.*)

NAMES (*Varieties.*)	Origin.	DESCRIPTION. Fruit. Use.	Size.	Form.	Color.	Quality.	Season.	Plant. Vigor.	Prolificness.	Adaptability. Western North Fla	Eastern North Fla.	Central Florida.	Southern Florida.
Blackberries—*Rubus villosus*.....	A	d n								*	*	—	
Dewberries—*Rubus canadensis*.....	A	d n								*	*	*	
Loquats—*Eriobotra Japonica*.....	F	d n	m	e	y	v g	Sp	v	p	*	*	**	
Olives - *Oleo Europea*	F	c s	s	e	r b		F	v	p		*	*	
Surinam Cherry (*Eugenia Micheli*).	E I	d c	s	r		y						*.	*

Dewberries, also Blackberries in some varieties. succeed admirably in the regions indicated, but are not cultivated to any considerable extent, owing to the abundance of native, wild berries.

Loquats—Are quite generally grown in a small way for home consumption. They are a very desirable fruit for table, as well as culinary use. At present the Loquat is propagated from seed, and the fruit varies greatly in size and quality. Improved varieties should be originated and disseminated.

Olives—Do well. Many trees have been planted, and there are some old groves. The varieties, of which there are many, are not sufficiently known in this State to catalogue.

The Surinam Cherry—A delicious. acid fruit—is grown to a limited extent, for home use.

TROPICAL FRUITS.

PINEAPPLES—(*Annas sativa.*)

(*See "EXPLANATION OF ABBREVIATIONS", on page iv.*)

NAMES (*Varieties.*)	Origin.	DESCRIPTION. Fruit. Use.	Size.	Form.	Color.	Quality.	Season.	Plant. Vigor.	Prolificness.	Adaptability. Western North Fla	Eastern North Fla.	Central Florida.	Southern Florida.
1 Abachi (Abakka)....	F	d c	m	o l		b	S			—	—	—	
2 Black Antigua	F	d c	l	o l	d	b	S			—	—	—	Require protection.
3 Black Jamaica	F	d c	l	o l	dy	b	S			—	—	—	*
4 Black Prince	F	d c	l	e		b	S			—	—	—	†

PINEAPPLES—Continued.

NAMES (*Varieties*).	Origin.	DESCRIPTION. Fruit. Use.	Size.	Form.	Color.	Quality.	Season.	Tree or Plant. Vigor.	Prolificness.	Adaptability. Western North Fla.	Eastern North Fla.	Central Florida.	Southern Florida.
5 Blood	F	d c	m			g	S			—	—		†
6 Crown Prince	F	d c	l	c		b	S			—	—		†
7 Charlotte Rothschild	F	d c	m	c		b	S			—	—		†
8 Egyptian Queen	F	d c s	m	c	y	b	S	v	p	—	—		**
9 Lady Beatrice	F	d c	l	c		b	S			—	—		†
10 Lord Carrington	F	d c	l	c		b	S			—	—		†
11 Mammoth Kew	F	d c	v l			b	S			—	—		†
12 Prince Albert	F	d c	l	c		b	S			—	—		†
13 Porto Rico	F	d c	v l	r	y	g	S			—	—	Require protection.	**
14 Red Spanish	F	d c s	m	r	r y	f	S	v	v p	—	—		**
15 Ripley Queen	F	d c	m	c	y	b	S			—	—		**
16 Smooth Cayenne	F	d c	l	c		g	S			—	—		*
17 Sugar Loaf	F	d c	m	c	y	b	S			—	—		*
18 Trinidad	F	d c	l	c	y	b	S			—	—		†
19 White Antigua	F	d c	m	c l	l	b	S			—	—		†

PINEAPPLE CULTURE—Is one of the most extensive fruit-growing industries in the State.

VARIETIES—The Red Spanish is the variety generally grown for market; it is also known as "Black Spanish", "Scarlet Key", "Largo", "Havana", "Cuban", "Strawberry", etc. The Egyptian Queen is also planted, to some extent, for market.

BANANAS—(*Musa*).

(*See "EXPLANATION OF ABBREVIATIONS", on page iv.*)

NAMES (*Varieties*).	Origin.	DESCRIPTION. Fruit. Use.	Size.	Form.	Color.	Quality.	Season.	Tree. Vigor.	Prolificness.	Adaptability. Western North Fla.	Eastern North Fla.	Central Florida.	Southern Florida.
1 Baracoa (*Red Jamaica*)	W I	d s	l		r	g		v	p	—	—	—	**
2 Cavendish	E I	d s	m		y	b		v	p	—	—	—	**
3 Golden (*Tahiti?*)	W I	d n	l		y	g		v	p	—	—	*	**
4 Harts Choice	W I	d n	s		y	b		v	p	—	—	*	**
5 Magnifera	W I	d s	l		r	g		v	p	—	—	—	†
6 Orinoco (*"Horse Banana"*)	S A	d e n	l		y	f		v	p	—	—	*	**

REMARKS—On varieties as numbered above. Nos. 1, 2 and 3, general market; 4 and 6, home use.

COMMERCIAL BANANA CULTURE is confined to the extreme lower portions of the peninsula.

VARIETIES.—The Baracoa is the ordinary Red Banana of commerce. The Cavendish (*M. Cavendishii*) is a dwarf species, also known as "Dwarf", "Dwarf Jamaica", "Chinese", "Martinique". Except the Orinoco, Hart's Choice has a more northern range than the other sorts. The Orinoco matures further north than any other variety, it is an ordinary plantain (*M. paradisica sapientum*) as distinguished from the Banana or Sweet Plantain (of which Baracoa and Golden are varieties); when allowed to ripen on the plant, it is of good quality, and desirable for home use, in sections too far north for other kinds.

GUAVAS—(*Psidium*).

(*See "EXPLANATION OF ABBREVIATIONS", on page iv.*)

NAMES.	Origin.	DESCRIPTION. Fruit. Use.	Size.	Form.	Color.	Quality.	Season.	Plant. Vigor.	Prolificness.	Adaptability. Western North Fla.	Eastern North Fla.	Southern Florida.	Central Florida.
1 Common Guava (*P. Guaiava*) — many unnamed varieties ...	W I	d e n					S&F	v	v p	—	—	*	**
2 White Winter (*P. Guaiava*)	W I	d e n	m	p	g	g	F	v	p	—	—	*	**
3 Cattley (*P. Cattleyanum*)	A	e n	s	r	r	g	S&F	v	p		*	**	**
4 Chinese (*P. Lucidum*)		e n	s	r	y	g	S&F	v	p		*	**	**

REMARKS—On varieties as numbered above. No. 2, distinct and desirable; 3 and 4, hardy.

THE GUAVA is quite extensively grown in Central and Southern Florida for home use, local market, and the manufacture of jelly. It is a most delicious fruit for dessert, as well as cooking and preserving. There are numerous varieties, as yet unclassified. The hardy kinds, Cattley and Chinese, have about the same range as oranges.

MANGOES—(*Mangifera Indica*).

(*See "EXPLANATION OF ABBREVIATIONS," on page iv.*)

NAMES (*Varieties*).	Origin.	DESCRIPTION. Fruit. Use.	Size.	Form.	Color.	Quality.	Season.	Tree. Vigor.	Prolificness.	Adaptability. Western North Fla.	Eastern North Fla.	Central Florida.	Southern Florida.
1 Common (the ordinary sort) ..	E I	d e n	l	k	y&r	g	S	v	p	—	—	*	*
2 Apricot	W I	d e n	m	k	r&y	v g	S	v	p	—	—	*	**
3 No. 11 (*Apple*)	W I	d e n	l	▲	y	v g	S	v	p	—	—	*	**

Citrus Experiment Station
Alfred, Florida

MANGOES—Are very generally grown in Tropical Florida for home consumption, local market, and to some extent for shipment. Many new sorts, of probable superiority, have been introduced in recent years, but have not been sufficiently tested to be catalogued.

COCOANUTS—(*Cocos nucifera*).

(*See "EXPLANATION OF ABBREVIATIONS", on page iv.*)

NAMES.	Origin.	DESCRIPTION. Fruit. Use.	Size.	Form.	Color.	Quality.	Season.	Tree. Vigor.	Prolificness.	Adaptability. Western North Fla.	Eastern North Fla.	Central Florida.	Southern Florida.
Seedlings	F	d c s	l	r	br	b	Ev	v	p	—	—	—	**

Extensive COCOANUT plantations are to be found on the southern coast. Little or no attention has been paid to varieties.

MINOR TROPICAL FRUITS.

(*See "EXPLANATION OF ABBREVIATIONS", on page iv.*)

NAMES.	Origin.	DESCRIPTION. Fruit. Use.	Size.	Form.	Color.	Quality.	Season.	Tree or Plant. Vigor.	Prolificness.	Adaptability. Western North Fla.	Eastern North Fla.	Central Florida.	Southern Florida.
1 Avocado Pear (*Persea gratissima*)	W I	d c s	l	p	y&b r	g	S & F	v	p	—	—	—	**
2 Cherimoya (*Anona cherimolia*)	SA	d n	l	e	br y	g	S	v	p	—	—	—	**
3 Custard Apple (*Anona reticulata*)	W I	d c	l	c	g	g	S	v		—	—	*	*
4 Granadilla (*Passiflora edulis*)	W I	d c	m	r	l r	g	S	v		—	—	—	*
5 Hog Plum (*Spondius lutea*)	W I	d	s	r	g	b	S	v		—	—	—	*
6 Jamaica Sorrel (*Hibiscus sabdiriffa*)	E I	c	m		r		F	v	p	*	*	**	**
7 Mammee Apple (*Mammea Americana*)	W I	d s	l	r	br	g	S			—	—	—	*
8 Mammee Sapota (*Lucuma mammosa*)	W I	d s	l	e	y	g	S			—	—	—	*
9 Otaheite Gooseberry (*Cicca disticha*)	W I	c	s	r	w	g		v	p	—	—	—	*

MINOR TROPICAL FRUITS—Continued.

NAMES.	Origin.	DESCRIPTION. Fruit. Use.	Size.	Form.	Color.	Quality.	Season.	Tree or Plant. Vigor.	Prolificness.	Adaptability. Western North Fla.	Eastern North Fla.	Central Florida.	Southern Florida.
10 Pawpaw (*Carica papaya*).....	E&WI	d c n	l	e	y	f	Ev	v	p	—	—	—	**
11 Rose Apple (*Eugenia Jambos*)	EI	d c	m	r	l	f	Sp&S	v	p	—	—	—	**
12 Sapodilla (*Achras sapota*)	WI	d s	m	r	br	g	Ev	v	p	—	—	—	**
13 Sour Sop (*Anona muricata*)...,	WI	c	l	c	g	g	S	v	p	—	—	—	*
14 Spanish Lime (*Melicocca biguga*)	WI	d	s	r	g	g	S	v	p	—	—	—	**
15 Star Apple (*Chrysophllum cainito*)	WI	d	m	r	g	g	S p	v	p	—	—	—	*
16 Sugar Apple (*Anona squamosa*)	WI	d c	m	c	g	g	S&F	v	p	—	—	*	**
17 Tamarind (*Tamarindus Indicus*)	EI	d s	sm	pod	br	f	Ev	v	p	—	—	—	**

REMARKS—On species as numbered above: Nos. 1, 7, 12 and 17 sell well in general market; 2, 3 and 16, much admired in the tropics; 5, delicious; 6 and 9, desirable for cooking; 13 and 17, esteemed for acid drink; 4, 6, 9 and 11, especially fine for jelly.

THE MINOR TROPICAL FRUITS—Listed above are none of them raised for market on a large scale, but all are desirable, and are extensively grown, over a more or less extended area, in the more tropical regions of the State, a number being produced in considerable quantities for local market or consumption. A few, like the Mammee Apple, Sapodilla and Avocado Pear, ship well and find ready sale; the Avocado Pear has brought good prices in the New York market. Some, like the foregoing, the Star Apple and the Hog Plum, are agreeable to most palates upon first acquaintance; others, like the Sugar Apple, Cherimoya, and Sour Sop, which are much esteemed by those accustomed to the fruit, require an acquired taste to be appreciated. A number are grown for home use, almost or quite exclusively, either because too tender for transportation, like the Sugar Apple and Pawpaw, or for their value for culinary purposes; of the latter, the Otaheite Gooseberry is a valuable acid fruit for cooking and preserving; the Jamaica Sorrel is not a fruit, in the proper sense, but produces a pulpy calyx, which makes an excellent substitute for cranberries; the acid Sour Sop is used for flavoring, preparing drinks, etc., and is much esteemed in sickness. The Tamarind bears a pod with a pleasant acid pulp which, preserved in sugar, finds ready sale in the general market.

FLORIDA STATE HORTICULTURAL SOCIETY.

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